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ABSTRACT

A 1997 report estimates Minnesota needs to spend up to \$4.5 billion to replace or improve its current educational facilities to meet the needs of its students in the future. This guide, designed to encourage and guide Minnesota school districts in enhancing student achievement and school-community partnerships, summarizes changes in laws and regulations for educational facility funding options and construction project proposals; highlights some of the latest ideas in planning and designing school sites, space design, and related issues; and examines essential considerations when designing middle level and community use/partnership spaces in schools. Minnesota state regional and local agency procedural requirements for school construction project review are included. Related issues and considerations involving the development of partnerships with community groups, public agencies, and private users; urban and rural schools; school security; indoor air quality; lighting and electrical systems; and charter and private schools conclude the guide. Major sources of information are cited at the end of each part or subpart. (Contains 10 tables.) (GR)

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*Children,
Families & Learning*

**GUIDE FOR
PLANNING
SCHOOL
CONSTRUCTION
PROJECTS IN
MINNESOTA**

REVISED
MAY, 1999

DIVISION OF
MANAGEMENT
ASSISTANCE

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GUIDE FOR PLANNING SCHOOL CONSTRUCTION PROJECTS IN MINNESOTA

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This Guide for Planning School Construction Projects in Minnesota (hereafter "Guide") is a revision of the 1988 Guide for Planning New and Improved School Facilities in Minnesota. All of the following contributors were part of the advisory committee and/or the drafting, discussing, and reviewing of the Guide. Many thanks to all persons who contributed to this effort.

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Introduction and Purpose of the Guide

The challenges of the year 2000 and beyond for schools are immense. How will schools create high expectations for student achievement and help students meet new graduation standards? Use technology to enhance learning? Increase student readiness for school and promote life work development? Reduce school violence and dropouts? Create a more satisfactory work place for teachers and school staff? Expand the school day and year, and customize educational services? Increase school-community partnerships?

How much new school construction and renovation is needed in Minnesota? A 1997 report to the Minnesota Legislature estimates that over the next 10 years Minnesota school districts need to spend up to \$4.5 billion to replace, renovate, and improve existing school facilities, meet technology infrastructure needs, and satisfy accessibility and health and safety requirements.

The purpose of the 1999 Guide is to encourage and guide school district planning of school construction projects that will enhance student achievement and school-community partnerships. The Guide should be an initial reference source for school facilities planning committees composed of teachers, parents, citizens, school administrators, students, and representatives of community organizations. The goal is to write the Guide in a user-friendly, non-technical manner so that school facilities planning committees will understand the guidelines for school sites, learning, school support, and community use/partnership spaces. The intent is to inform school district officials and school facilities planning committees of important requirements, and provide an overview of the many considerations that go into designing school facilities. Space descriptions will provide teachers and planners with design ideas and essential elements to consider in a space, not prescribe a space design. School facilities planning committees need to be visionary and creative in making design and space decisions and continuously ask: "what will our students-staff-community users need now and in 10-20 years to help them succeed?"

The Guide is not meant to be a technical reference manual for architects/engineers; to include lengthy discussions on school construction, heating, ventilation and air-conditioning systems, or building code, fire, health and life safety, and accessibility requirements; or contain very detailed specifications for learning, support, and community use/partnership spaces. Persons interested in more detail on school spaces or subjects must consult additional sources.

The 1999 Guide is lengthier because it incorporates changes in laws and regulations (Section I), inserts middle level and community use/partnership space descriptions (Section III), and highlights some of the latest ideas in school site, space design, and related issues (Sections II-IV). A statement of purpose and introductory remarks will be made at the beginning of each section. Major sources of information are cited at the end of each part or subpart.

Finally, it is the intent to make the 1999 Guide and subsequent revisions available on the Department of Children, Families & Learning (CFL) web site @ <http://cfl.state.mn.us>. Click on Programs & Services, then click Facilities/Organization to find information on the Guide, review and comment requirements, recent and current school construction project proposals, and related school facilities issues.

Sources:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>STATUS OF PUBLIC SCHOOL FACILITIES IN MINNESOTA: A REPORT TO THE 1997 LEGISLATURE</i>	<i>MINNESOTA DEPARTMENT OF CHILDREN, FAMILIES & LEARNING</i>
<i>WEB PAGE @ HTTP://CFL.STATE.MN.US</i>	<i>MINNESOTA DEPARTMENT OF CHILDREN, FAMILIES & LEARNING</i>

Editor's Note: the level and quality of submissions received and current research used on the many topics in this Guide varied considerably. Necessarily, some parts and discussions are more current than others, and future revisions will be necessary.

SECTION I. LEGAL RESPONSIBILITIES, FUNDING, PROCEDURES

The purpose of Section I is to provide summary information on the basic legal responsibilities of school districts concerning school facilities, financing options for school construction projects, and highlight Department of Children, Families & Learning and other State, regional, and local agency procedural requirements for school construction project review. School districts and school facilities planning committees need to use this information to help understand the legal requirements and funding options for school construction project proposals.

Part 1.01 School District Responsibilities

(a) School Sites and Facilities

Minnesota Statutes, Chapter 123B.02, subdivisions 1-2 and 7-8 give school boards of independent school districts the authority to conduct school district business that relates to school facilities. The school district must provide school facilities for all resident students, and, with voter or school board approval in most cases, issue bonds and levy to pay for school facilities. M.S. 475.52, subd. 5, authorizes school districts to issue bonds for the acquisition or improvement of school facilities, including gymnasiums, athletic fields, stadiums, garages, academic instruction, physical and vocational education, and administration. A school district may acquire sites for school buildings or garages using the power of eminent domain if necessary (M.S. 123B.51, subd. 1, and 123B.74). The school district may also authorize the use or lease of school facilities for other purposes (subdivisions 2-4).

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.02</i>	<i>1-2, 7-8</i>
<i>123B.51</i>	<i>1-4</i>
<i>123B.74</i>	
<i>475.52</i>	<i>5</i>

(b) Closing and Selling a School Building

M.S. 123B.51, subdivisions 5-6, authorize school districts to close a school after holding a public meeting and providing a written statement of the reasons for the closure. A school building or property may be sold, with the proceeds from the sale used to pay first, any outstanding indebtedness on the building/property, and then for other specified uses such as the cleanup of polychlorinated biphenyls, capital expenditures, or the replacement of the building/property.

Source:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.51</i>	<i>5-6</i>

(c) Compliance Responsibilities

In planning, developing, and implementing school construction projects, school districts must comply with a complex variety of state, federal, and local laws, rules, and codes. It is very important that school boards employ licensed, knowledgeable, and competent persons (administrators, architects, engineers, contractors and construction managers, fiscal consultants, attorneys) to represent the school district throughout this process. The highlights of many of the laws, rules, and codes that school districts must comply with are discussed throughout this Guide. Responsible persons representing the school district must further consult building code, fire safety, indoor air quality, and other laws, rules, ordinances, and codes as appropriate.

In proceeding with school construction projects, school board members must be aware of the responsibility they have to make sure that all the orders that they sign are legal; i.e., comply with all laws, rules, and codes affecting school construction projects. The drawing of an illegal order subjects school board members to legal action by an eligible voter and possible monetary damages (M.S. 123B.17).

Source:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.17</i>	

Part 1.02 Financing School Construction Projects

School districts have access to a variety of financing options for school construction projects under Minnesota statutes. Determining which financing option is best for any particular project will depend on a variety of factors and will vary from project to project and school district to school district. This part of the Guide will provide a brief overview of project financing options, subject to change each legislative session. For further information about any of these options, unless otherwise noted, please contact:

Division of Program Finance
Education Funding Team
Department of Children, Families & Learning
1500 Highway 36 West
Roseville, MN 55113-4266
(651) 582-8816

(a) General Obligation Bonds

Under M.S. 475.52, subd. 5, school districts, with voter approval, may issue general obligation bonds to finance school construction projects. This includes new schools or school additions/renovations, and related purchases of equipment and software, technology infrastructure and energy improvements, and staff planning and development. Any school construction project in excess of \$400,000 requires a commissioner review and comment under M.S. 123B.71.

Sources:

MINNESOTA STATUTES	SUBDIVISIONS
475.52	5
123B.71	
123B.53	

(b) Alternative Facilities Bonding and Levy

Under M.S. 123B.59, larger school districts with over 1,850,000 square feet of space and with an average school building age of 15 or more years are eligible to participate in this program if projected capital facilities and health and safety revenues are insufficient to meet their facility needs. A school district with a commissioner approved and/or updated ten-year facility plan may bond or levy annually for remodeling projects and/or deferred maintenance, health and safety, and accessibility repairs or improvements. The use of alternative facilities bonds does not require voter approval. Debt service equalization may also be available.

Source:

MINNESOTA STATUTES	SUBDIVISIONS
123B.59	

(c) Building Bonds for Calamities/Emergency Management

School districts may issue general obligation bonds without voter approval under M.S. 123B.60 to finance the construction or repair of a school building(s) damaged by an act of God or other calamities beyond the control of the district. The commissioner must approve a combined application for the use of health and safety revenues under M.S. 123B.57 and the use of other revenues with review and comment approval.

In the event of a declared disaster or emergency declared under M.S. 12.03, financial aid and other assistance may be available from the State or federal emergency management agencies. During such a declared disaster or emergency, under M.S. 12.37 school districts may enter into contracts, incur obligations, and exercise powers without complying with laws relating to contracts, bidding, purchasing, etc.

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.60</i>	
<i>123B.57</i>	
<i>123B.71</i>	
<i>12.03</i>	
<i>12.37</i>	

(d) Bonds for Certain Capital Facilities

Under M.S. 123B.62, school districts may issue general obligation bonds without voter approval for a period up to 10 years to finance capital improvements, including school facility repairs and improvements, disabled access, fire, life, and safety code compliance, and other cleanup and energy modifications.

Use of bonds requires commissioner approval, and the bonds must be paid off using school district operating capital revenues. The school district is not eligible for any additional levy authority or debt service equalization aid from the State. A petition by 15% of the registered voters of the school district necessitates an election on the proposed issuance of the capital facility bonds.

Source:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.62</i>	

(e) Debt Service Equalization

To help finance authorized capital facility improvements (unless otherwise excluded), M.S. 123B.53 provides for State debt service equalization aid for a school district with a low property valuation makes a debt service levy exceeding 12% of their adjusted net tax capacity. A formula determines the precise dollar amount of debt service equalization aid.

To qualify for debt service aid, a school district must receive a positive review and comment from the commissioner under M.S. 123B.71, and meet criteria listed in M.S. 126C.69, subd. 3, paragraph (a), or be eligible for sparsity revenue.

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.53</i>	
<i>123B.71</i>	
<i>126C.69</i>	<i>3</i>

(f) Disabled Access and Fire Safety Improvements

School districts may levy up to \$300,000 per year over eight years to remove architectural barriers to access a school building and to make other required fire safety improvements. The levy requires commissioner approval.

Source:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.58</i>	

(g) Down Payment Levy

School districts, with voter approval, may make a down payment levy for future school construction costs under M.S. 123B.63. There are no limits as to the amount of the levy or the number of years, and the proceeds must be placed in a separate account. The levy requires commissioner review and comment under M.S. 123B.71.

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.63</i>	
<i>123B.71</i>	

(h) Health and Safety

Under M.S. 123B.57, school districts may levy for and use health and safety revenues to continuously maintain, update, and improve school facilities in many areas, including but not limited to the following:

science lab safety compliance and audit costs	weather/flood-related damage
fire prevention and life safety	bleacher repair or rebuilding
asbestos training, removal, encapsulation	flood-related damage
indoor air quality, management plan	playground resurfacing
health, safety, and environmental management	OSHA physical or electrical hazard violations
ergonomics	food code safety
fuel tank removal	hazardous/infectious waste management
testing for lead in water	exhaust ventilation systems
school facility demolition	bloodborne pathogen standard compliance
fire alarm equipment	boiler control circuit
facility demolition	fire alarm equipment, fire extinguishers
fire marshal orders	lighting
facility evaluation for structural safety	facility modifications

Health and safety revenues may not be used for new school construction, renovation of existing schools, portable or re-locatable classrooms, or to pay for part of a construction project that results in an increase in the square footage of the school facility.

An application for health and safety levy and state aid requires commissioner approval. For further information on health and safety program requirements please contact:

Division of Management Assistance
Facilities & Organization Team
Department of Children, Families & Learning
(651) 582-8748

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.57</i>	
<i>PUBLICATION</i>	<i>SOURCE</i>
<i>CAPITAL EXPENDITURE: HEALTH AND SAFETY REVENUE APPLICATION</i>	<i>DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1999</i>

(i) Historic Building Revenue

Under M.S. 123B.60, school districts that maintain a school building listed on the National Historic Register are eligible for an annual levy and State aid revenues up to \$100 times the pupil units served in the building.

Source:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.60</i>	

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(j) Lease-Purchase Agreement and Lease-Levy

Under M.S. 465.71, school districts may enter into a lease-purchase agreement to acquire a building, site, or equipment over a period of years. Payments are made using school district general or operating capital revenues.

School districts may levy taxes to raise revenues to rent or lease land or a building for instructional purposes under M.S. 126C.40. The levy requires meeting criteria for approval by the commissioner. School districts may not levy for newly constructed K-12 school facilities, or additions that contain more than 20% of the square footage of the K-12 facility, or for sports stadiums.

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
465.71	
126C.40	

(k) Operating Capital Revenue

M.S. 126C.10, subd. 13, provides school districts with operating capital revenue based in part upon the average age of district buildings. Operating capital revenues may be used for a variety of purposes, including acquiring, constructing, renting or leasing, or improving and repairing buildings (subd. 14).

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
126C.10	13
126C.10	14

(l) Operating Referendum

M.S. 126C.17, authorizes school districts to increase general fund revenues through voter approval of an operating referendum. There is a per pupil unit amount limit to total operating referendum revenues, and the State provides equalization aid.

The merging of the school district capital fund into the general fund in 1995 allows school districts to use general and referendum revenues for any purpose authorized for the use of capital revenues under M.S. 126C.10, subd. 14.

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
126C.17	
126C.10	14

Part 1.03 Loans, Grants, and Cooperative Agreements for School Construction Projects

(a) Capital Loan

Under M.S. 126C.69, subd. 1, capital loans may be used by eligible school districts to acquire, construct, and improve school sites and facilities, but not to construct swimming pools, ice arenas, athletic facilities, auditoriums, bus garages, or make heating system improvements. School districts are eligible to apply for a capital loan if their debt service equalization payments after equalization aid are greater than 24% of their adjusted net tax capacity, and the district will serve on average at least 80 students per grade, or be eligible for sparsity revenue (subdivisions 2-3).

School districts (or joint powers districts) applying for a capital loan must submit to the commissioner the information required for a review and comment under M.S. 123B.71, a predesign package to the commissioner of finance as stipulated in M.S. 16B.335, and other information as required on or before July 1 of an odd-numbered year (subdivisions 3-6).

After commissioner and school district voter approval (subd. 11), the commissioner reports capital loan applications to the education committees of the Legislature by January 1 of each even-numbered year (subd. 8). Each capital loan must be approved in law, and requires a contract between the school district and the State (subdivisions 10, 12).

For further information about a capital loan, please contact:

Education Funding Team/Facilities & Organization Team
Department of Children, Families & Learning
(651) 582-8801/(651) 582-8756

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>126C.69</i>	<i>1-3</i>
<i>123B.71</i>	
<i>16B.335</i>	
<i>126C.69</i>	<i>3-6</i>
<i>126C.69</i>	<i>8, 10-12</i>

(b) Cooperative Secondary Facilities Grant

Under M.S. 123A.44-.446, two or more school districts may apply for a grant not to exceed the lesser of \$5 million or 75% of the cost of a new cooperative secondary facility. An additional \$1 million collocation grant is also available if a significant number of non educational student and community service programs are located within the cooperative facility. A grant for remodeling an existing secondary facility may not exceed \$200,000. Planning grants of \$50-100,000 may be made to assist districts in developing a proposal for a cooperative secondary facility.

The commissioner must issue a positive review and comment under M.S. 123B.71 by July 1 of an odd-numbered year, and the school districts must submit a grant application and education plan, and meet all other requirements. The school districts must select a school site before a grant is awarded. After approval by the Legislature and governor, a referendum authorizing the borrowing of funds for the cooperative secondary facility must receive local voter approval. The cooperating districts must also fulfill the requirements of consolidation under M.S. 123A.48. For further information on the cooperative secondary facility grant please contact:

Division of Management Assistance
Facilities & Organization Team
Department of Children, Families & Learning
(651) 582-8756 or 8757

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123A.44-.446</i>	
<i>123B.71</i>	
<i>123A.48</i>	

(c) Energy Investment Loan

School districts may apply under M.S. 216C.37 for low interest loans to finance energy improvements such as roof insulation, window retrofits, lighting modifications, energy management systems, HVAC modifications, and conversions to alternative fuels. School districts are eligible for up to \$1.5 million in loans, and loan payback terms must be ten years or less. Loan funds are procured from the State and/or the Petroleum Violation Escrow (Exxon) fund.

Energy efficiency projects that develop energy conservation measures through contracting with qualified providers are discussed in M.S. 123B.65.

For further information on the energy investment loan program and loan fund availability please contact:

Energy Investment Loan Program
Minnesota Department of Public Service
121 7th Place East, Suite 200
Saint Paul, MN 55101-2145
(651) 297-1221

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>216C.37</i>	
<i>123B.65</i>	

(d) Joint Powers Agreements for Facilities

Under M.S. 123A.78, groups of school districts or governmental units may form a joint powers agreement under M.S. 471.59 to build or acquire a school facility. The school districts must receive a positive review and comment from the commissioner under M.S. 123B.71, local voter approval, if required, and meet all other related requirements.

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123A.78</i>	
<i>471.59</i>	

(e) Metropolitan Magnet School Grant

A group of school districts within the metropolitan seven-county area may apply for a magnet school grant under M.S. 124D.88 to improve the education opportunities, academic achievement of, and facilities available to disadvantaged children in grades PK-12. Grant funds not to exceed \$15 million may be used to design, construct, remodel or improve, or equip a magnet school or magnet school site.

Applicant school districts must submit an application for a grant, receive a positive review and comment from the commissioner under M.S. 123B.71, and meet all other requirements. For further information on a metropolitan magnet school grant please contact:

Division of Management Assistance
Facilities & Organization Team
Department of Children, Families & Learning
(651) 582-8756

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>124D.88</i>	
<i>123B.71</i>	

(f) School Building Accessibility Capital Improvement Grant

School districts may apply for a school building accessibility grant under M.S. 123B.67-.69 to remove architectural barriers from a building or site. The school district must match the grant, which may not exceed \$150,000 in any fiscal year. Applications are due July 1 of each year, and commissioner approval is required.

Priority shall be given to school districts that have consolidated or combined since January 1, 1987, and who meet other criteria as specified in M.S. 123B.69, subd. 3. For further information on accessibility grants please contact:

Division of Special Education
Department of Children, Families & Learning
(651) 582-8668

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.67-.69</i>	
<i>123B.69</i>	<i>3</i>

(g) Technology and Telecommunications Grants

There are a variety of State and federal programs and grants that provide assistance resources to school districts in developing technology and telecommunications. This includes technology levy authority, grants for hardware, software, wiring, networking, and training, library site technology grants, early childhood technology grants, computers for schools, and telecommunications access grants. Private foundations and companies also offer assistance and grants.

School districts should closely monitor State, federal, and private foundation sources of information for new and changing programs and grants in the technology and telecommunications area. For further information on technology and telecommunications programs, please contact:

Office of Teaching & Learning
School Technology Team
Department of Children, Families & Learning
(651) 582-8806

(h) State Grants

The legislature provides other grants to school districts through direct appropriations and the bonding bill. For example, in 1998, \$62.4 million was appropriated through the Department of Children, Families & Learning for grants in the areas of Early Childhood Learning Facilities, Youth Enrichment, Recreation and Community Center Grants, Metropolitan Magnet Schools, Community Schools Partnership, and other areas. Some of these grants are based on existing laws (e.g. Metropolitan Magnet Schools), some require school districts to develop a written proposal (e.g. Youth Enrichment), and others are direct grants to individual or several school districts working with and through their legislators. For further information on any of these grant opportunities please contact:

Division of Management Assistance
Facilities & Organization Team
Department of Children, Families & Learning
(651) 582-8756

Source:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>LAW'S OF MINNESOTA, 1998 CHAPTER 404, SECTION 5</i>	<i>1-13</i>

Part 1.04 Department of Children, Families and Learning School Construction Project Review Requirements

M.S. 123B.71 Review and Comment for School District Construction requires school districts to consult with and submit a package of information on school construction project proposals to the commissioner of the Department of Children, Families & Learning. Staff members from the facilities and organization team represent the commissioner in this process. For further information please contact:

Division of Management Assistance
Facilities & Organization Team
Department of Children, Families & Learning
(651) 582-8756 or 8757

(a) Consultation

M.S. 123B.71, subd. 1, requires a school district to consult with the commissioner "before developing any plans and specifications to construct, remodel, or improve the building or site of an educational facility for which the estimated cost exceeds \$100,000" and "before a referendum for bonds, solicitation for bids, or use of capital expenditure facilities revenue...." Consultation may involve a tour of school district facilities to gather information about the facility needs and the project proposal(s) under consideration. The commissioner may require a management assistance study before issuing a review and comment on the project proposal.

The school facilities team may issue an advisory letter or opinion on the construction project proposals under consideration when requested by a school district. The purpose of an advisory letter or opinion is to make a preliminary assessment of the economic and educational advisability of a project proposal.

Any school construction project proposal requiring consultation may also require the submission of preliminary plans and final plans for review and approval. "Final plans must meet all applicable state laws, rules, and codes concerning public buildings, including sections 16B.59 to 16B.73" (subd. 4).

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.71</i>	
<i>123B.71</i>	<i>1.4</i>

(b) Review and Comment

M.S. 123B.71, subd. 8 states: "A school district, a special education cooperative, or a cooperative unit of government, as defined in section 123A.24, subdivisions 1-2, paragraph (d), must not initiate an installment contract for purchase or a lease agreement, hold a referendum for bonds, nor solicit bids for new construction, expansion, or remodeling of an educational facility that requires an expenditure in excess of \$400,000 per school site prior to review and comment by the commissioner. The commissioner may also exempt a facility maintenance project funded with general education aid and levy or health and safety revenue from this provision after reviewing a written request from a school district describing the scope of work. A school board shall not separate portions of a single project into components to avoid the requirements of this subdivision."

Examples of facility maintenance projects include roofing or window repairs/ replacement, parking lot repairs, site or field work, boiler room work, gymnasium floor replacement, or projects that qualify for health and safety revenues, **provided that the maintenance project is not part of a larger school renovation or new construction project**. Please address any requests for maintenance project exemptions to the commissioner and send them to the attention of the facilities and organization team

M.S. 123B.71, subdivisions 9-10 require that school districts submit to the commissioner for the purpose of a review and comment a package of information as summarized below (check annually with the school facilities and organization team for amendments/updates to this package of information):

- the geographic area and population likely to be served, whether within or outside the boundaries of the school district, including enrollment projections for the next five years;
- a description of existing facilities and their extent of utilization, and the extent to which alternate facilities are available within the school district or adjacent school districts, including institutions of higher education or other public buildings;
- the reasonably anticipated need for the facility and service to be provided, and the anticipated effect and benefits of the construction project to the area, population, and students to be served;
- the relationship of the construction project to the cooperative integrated learning needs and any priorities, if known, that have been established for the area to be served;
- the level of collaboration proposed at the facility between the district and other governmental or nonprofit entities;
- a description of the construction project in reasonable detail, including estimated expenditures for the main portions of the project, and the dates the project will begin and be completed;

- a specification of the source(s) of financing the construction project. Districts qualifying for debt service equalization aid under M.S. 123B.53, subd. 2, need to address criteria listed in M.S. 126C.69, subd. 3, paragraph (a), or be eligible for sparsity revenue in the fiscal year the bond issue will be approved.
- the effects of the facility proposal on the district's operating budget, and the extent to which the district has minimized administrative staffing among facilities;
- a description of the consultation with local or State officials on any issue of school site road access and safety, and the manner in which the construction project will address any such issue;
- a description of how indoor air quality issues have been considered, and a certification that the architects and engineers designing the facility have professional liability insurance; and
- any desegregation requirements, provided they cannot be met by any other reasonable means.

The commissioner shall, within 60 days after receiving all the required and other pertinent information from the school district and other sources, submit to the school district the review and comment about the educational and the economic advisability of the school construction project proposal (subd. 11). The review and comment will state whether the school district will be eligible for debt service equalization under M.S. 123B.53, subd. 2, if the bond issue referendum is successful and/or the school district decides to proceed with the project.

A positive or unfavorable review and comment (see (c) below) from the commissioner must be published by the school district in the legal newspaper of the district at least 20 days, but not more than 60 days, prior to any referendum for bonds or the solicitation of bids for the school construction project proposal (subd. 12).

For the school district to proceed with construction project after a positive review and comment requires a 50 percent voter approval. If a construction contract for the project has not been awarded within two years of the date of the commissioner's approval, the approval is no longer valid. Substantial changes to the construction project proposal must also be submitted to the commissioner for approval. The school district shall certify to the commissioner that the project was completed according to the approved plans (subd. 5).

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.71</i>	<i>8</i>
<i>123A.24</i>	<i>1-2</i>
<i>123B.71</i>	<i>9-10</i>
<i>123B.53</i>	<i>2</i>
<i>126C.69</i>	<i>3</i>
<i>123B.71</i>	<i>11, 12, 5</i>

(c) Unfavorable Review and Comment

Under M.S. 123B.70, subd. 4, if the commissioner submits an unfavorable review and comment on a school construction project proposal submitted under M.S. 123B.71, the school board, by resolution of the board, must reconsider the project. With an unfavorable review and comment, even if voters approve the bond issue referendum, a school district is not eligible to receive any debt service equalization aid revenues under M.S. 123B.63. If the school board decides to proceed with the project, 60 percent of the voters must approve the project at an election to authorize the board to issue the bonds and proceed with the project.

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.70</i>	<i>4</i>
<i>123B.71</i>	
<i>123B.63</i>	

(d) Negative Review and Comment

Under M.S. 123B.70, subd. 3, if the commissioner intends to submit a negative review and comment on a school construction project proposal submitted under M.S. 123B.71, the school district must be notified and a public meeting scheduled within 60 days to discuss the proposed negative review and comment, and the school board must appoint an advisory committee to advise the school board and the commissioner. After attending the meeting, the commissioner must reconsider the proposal and the negative review and comment.

If the commissioner still intends to submit a negative review and comment, the school board may appeal the decision of the commissioner under chapter 14. **If the commissioner's decision is not appealed or upheld, the school district may not proceed with the proposed construction.**

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.70</i>	<i>3</i>
<i>123B.71</i>	

(e) School Facility Commissioning

M.S. 123B.72, subd. 3 requires that prior to occupying the new or renovated facility, a system inspector must verify that the facility's heating, ventilation, and air conditioning system has been installed and operates according to design specifications. School districts must submit this document to the local building code official or, *if none exists*, to the school facilities team, Department of Children, Families & Learning, and the State Building Codes and Standards Division (see Part 1.06 (b) below).

Source:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.72</i>	<i>3</i>

(f) Condemning School Buildings and Sites

The State fire marshal and/or commissioner may determine that a school building is unfit or unsafe for use, and condemn the building and close it.

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>299F.10</i>	
<i>123B.71</i>	<i>6</i>

Part 1.05 Other State, Regional, and Local Agency Requirements

(a) State Board of Architecture, Engineering, ... Landscape Architecture, and Interior Design

M.S. 326.02-.15 authorizes the Board to carry out the provisions of law regarding the licensing and practices of architects, engineers, land surveyors, landscape architects, geoscientists, and the certification of interior designers.

(1) M.S. 326.03 requires the licensing of persons practicing architecture, engineering, land surveying, landscape architecture, or geoscience in the preparation of plans, specifications, reports, or other documents in connection with any school construction project. In the preparation of such documents, reasonable care shall be given to compliance with applicable laws, ordinances, and building codes relating to design.

(2) Minnesota Rules, Parts 1800.5000-5800 exempts certain projects from requiring the services of a licensed architect or engineer pursuant to M.S. 326.02-.15. Regarding school construction projects, only cold storage facilities of less than 5,000 square feet are exempt from this requirement. Certain remodeling projects which do not change structural loads, the loads on mechanical (HVAC) and electrical distribution systems, occupancy, or fire and life safety requirements may also be undertaken without professional design services, provided the square footage maximums are not exceeded.

(3) M.S. 326.12 requires the signature of the appropriate licensed person(s) in applicable profession(s) on all plans, specifications, or reports which are required to be prepared or submitted for review. A certification that the signer is licensed shall also accompany the signature(s).

Printed rosters of licensed persons are available at the state bookstore. A copy of the current rules and statutes or verification of licensure or other related information is available from:

Executive Secretary
Board of Architecture, Engineering,
Land surveying and Landscape Architecture
85 East 7th Place
Suite 100
Saint Paul, MN 55101
(651) 296-2388

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>326.02-.15</i>	
<i>MINNESOTA RULES, CHAPTER</i>	<i>PARTS</i>
<i>1800</i>	<i>.5000-.5800</i>

(b) Minnesota Department of Administration, Building Codes and Standards Division

The Building Codes and Standards Division (BCSD), through authority granted in M.S. 16B.59, 16B.60, subdivisions 6 and 8, and 16B.61, subd. 1a, enforces the State Building Code for public school construction projects over \$100,000. This includes new construction, additions and remodeling work, and the construction and set up of temporary or re-locatable buildings.

School districts must submit an "Initial Application" to BCSD to determine who will do the plan review, issue the building permit, and complete the inspections. BCSD will notify school districts on who will be doing the enforcement, send the proper forms, and direct you how to proceed. To summarize:

- (1) If the local municipality is properly certified and contracted to do plan review and inspections, local plan review and permit procedures must be followed;
- (2) If the local municipality is contracted to do inspections only, a "Plan Review Application" with a fee must be submitted to BCSD for plan review, and the local building permit requirements must be followed; or
- (3) If BCSD will do both the plan review and inspections, the "Plan Review application" and the "Building Permit Application" must be submitted with fees to BCSD. BCSD will provide construction inspections.

The BCSD plan review staff will meet with design professionals and school staff for preliminary plan reviews and at any stage of the project, free of charge, help school districts' plan meet building code compliance requirements and prevent costly surprises in the later stages of construction project.

BCSD and local building officials enforce the laws and rules that require the involvement of licensed architects, engineers, and other design professionals in almost all school district construction projects.

For information on building code issues, how it will apply to your school construction project planning, or to receive an initial application form for an upcoming project, please call the BSCD at (651) 297-1648 or 296-4636.

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>16B.59</i>	
<i>16B.60</i>	<i>6, 8</i>
<i>16B.61</i>	<i>1a</i>
<i>Publication</i>	<i>AUTHOR</i>
<i>MINNESOTA STATE BUILDING CODE</i>	<i>BUILDING CODES AND STANDARDS DIVISION</i>

(c) Minnesota Department of Health

The Environmental Health Services section, Environmental Health Division, has the responsibility to review plans and specifications for school construction projects. School districts must submit two sets of plans and specifications for review before related installation or remodeling begins. In some cases, reviews may be done by local jurisdictions. The correct jurisdiction may be determined by contacting the Minnesota Department of Health at the appropriate numbers listed below. The applicable rules, scope, and a phone number contact for each area of responsibility are listed below:

- (1) Minnesota Rules, Chapter 4715 prescribes the methods and materials acceptable for plumbing installations. (651) 215-0836
- (2) Minnesota Rules, Chapter 4725 governs the construction of all water wells in Minnesota. (651) 215-0811
- (3) Minnesota Rules, Chapter 4717 prescribes construction standards and operating criteria for public swimming pools. (651) 215-0838
- (4) Minnesota Rules, Parts 4625.2400-.4900 governs the design and operation of foodservice establishments, including school cafeterias. (651) 215-0870
- (5) Minnesota Rules, Chapter 4720 relates to the testing required of schools that are on their own water system, not on a municipal water system. (651) 215-0765
- (6) Minnesota Rules, Chapter 7080 governs the construction of individual sewage treatment systems (septic tank/drain field). (651) 215-0839

Concern exists over lead contaminating drinking water from the use of lead-based solders in joining copper pipes. Procedures for flushing pipes should be initiated, if necessary. Lead-based solders will no longer be approved in school construction projects.

Sources:

<i>MINNESOTA RULES, CHAPTER</i>	<i>PART</i>
4715	
4725	
4717	
4625	.2400-.4900
4720	
7080	

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(d) Minnesota Department of Labor and Industry

Under both federal and state laws and rules, employers have responsibilities for providing for safe and healthy workplace or occupational conditions. OSHA standards implementing the 1973 Minnesota Occupational Safety and Health Act include (CFR=Code of Federal Regulation):

- (1) 29 CFR Part 1910 are Federal OSHA Standards which have been adopted by reference to apply to all places of employment except construction worksites. This includes, for example, worker exposure to asbestos.
- (2) 29 CFR Part 1926 are Federal OSHA Standards which apply to all phases and types of school construction projects, including remodeling, renovating, and new construction. The standards govern the safety and health of the employees involved in the actual construction work, not the safety or stability of the structure.
- (3) Minnesota Rules, Part 5205 are local general industry standards adopted by Minnesota OSHA that apply to hazards not covered by Federal OSHA Standards.
- (4) Minnesota Rules, Part 5206 contains standards that apply to all employers in Minnesota and require that employees be provided with information about the hazardous substances and harmful physical agents with which they work.
- (5) Minnesota Rules, Part 5207 are local construction standards adopted by Minnesota OSHA that apply to hazards not covered by Federal OSHA Standards.
- (6) Minnesota Rules, Part 5210 are administrative rules governing record keeping requirements, variance procedures, and employee discrimination.
- (7) 29 CFR Part 1910.1001 and 29 CFR Part 1926.58 are standards that provide guidelines for workplaces where employees are exposed to asbestos, including guidelines for the removal of asbestos. Special concern exists for school construction projects where older buildings are being remodeled.

Referrals may be made on inquiries concerning OSHA Standards to one of the following offices:

OSHA Division
Department of Labor & Industry
443 Lafayette Road
Saint Paul, MN 55155-4307
(651) 296-2116

OSHA Division
5 North 3rd Avenue West
Suite 402
Duluth, MN 55802-1611
(218) 723-4678

OSHA Division

Suite 110 Nicholas Office Center
410 Jackson Street
Mankato, MN 56001
(507) 389-6501

Sources:

<i>CODE OF FEDERAL REGULATIONS</i>	<i>PART</i>
29	1910
29	1926
29	1910.1001
29	1926.58
<i>MINNESOTA RULES CHAPTER</i>	<i>PART</i>
5205	
5206	
5207	
5210	

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(e) Minnesota Department of Natural Resources

Legislation enables the Department of Natural Resources (DNR) to establish statewide development standards and criteria for shoreland, floodplain, and wild and scenic river areas. Local units of government must adopt these standards through their local zoning or land use ordinances.

(1) Minnesota Rules, Parts 6120.500-.3900 provides for the orderly development of shoreland and protects lakes and rivers from pollution by individual sewage treatment systems and other non-point sources. The intent of the program is to encourage the development of shorelands in such a way that enhances water quality and preserves scenic resources.

(2) Minnesota Rules, Parts 6120.5000-.6200 intends to minimize the threat to life and property resulting from flooding. This program restricts development in flood plains by preventing structures from being built at low elevations in areas with a high risk of flooding, and controls encroachment that would reduce the floodplain's capacity to hold floodwater and cause flooding in properly located structures.

(3) Minnesota Rules, Parts 6105.0010-.0650 intends to preserve and protect rivers with outstanding scenic, recreational, natural, historical, and scientific value by preventing damage caused by intensive development and recreational use.

School districts need to contact their local units of government to determine how these rules or local ordinances may affect the planning of school construction projects on existing or new sites.

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>M.S. 103F</i>	
<i>MINNESOTA RULES</i>	<i>PART</i>
<i>CHAPTER</i>	
<i>6120</i>	<i>.500-.3900</i>
<i>6120</i>	<i>.5000-.6200</i>
<i>6105</i>	<i>.0010-.0650</i>

(f) Minnesota Department of Public Safety, State Fire Marshal Division

The Minnesota Uniform Fire Code (MUFC), adopted pursuant to authority granted in M.S. 299F.011, subd. 1, contains the fire/life safety requirements applicable to school construction projects. The MUFC currently consists of the 1997 Uniform Fire Code, as amended by Minnesota Rules, Parts 7510.3510-.3710. The updated MUFC references Minnesota State Building Code provisions instead of the life safety code to help eliminate conflicts between the State building and fire codes. Sprinkler installation standards have been updated to reflect the National Fire Protection Association Standard No. 13, 1996 edition.

School districts must submit school construction project plans and specifications to the State Building Codes and Standards Division for review. **School districts must also submit some school construction plans to the state fire marshal for review, including the following:**

- (1) Remodeling projects in existing buildings that involve the expenditure of M.S. 123B.57 Health and Safety funds in excess of \$10,000;
- (2) Automatic sprinkler system plans not reviewed by the State Building Codes and Standards Division or the local building or fire official. Preliminary sprinkler design drawings (including hazard type designations and the locations of risers, control valves, and fire department connections) are required to be submitted for all projects;
- (3) Fire alarm system plans; and
- (4) Site plans showing a) fire department access roads, and b) water supply and hydrant locations for fire protection.

In addition to the above, **MUFC requires that a fire protection plan be submitted to the state fire marshal for any school construction project involving major remodeling of or an addition to an existing building (including the installation of temporary or re-locatable buildings).** School districts and architects should review the publication "Existing School Buildings: Additions and Remodeling Considerations."

The State Fire Marshal Division also updates science lab safety and chemical storage requirements that apply to schools. These detailed checklists may be found in the health and safety application materials annually sent to school district superintendents.

Please direct any questions regarding plan requirements, fire/life safety requirements, or science lab or chemical storage requirements applicable to new and existing school buildings to the State Fire Marshal Division's school plan reviewer at (651) 215-0511. Mail plans and/or correspondence to:

State Fire Marshal Division
444 Cedar Street, Suite 145
Saint Paul, MN 55101-5145.

M.S. 123B.73 requires the state fire marshal to conduct periodic inspections of all public school buildings in the state. Some local fire departments also conduct routine fire/life safety inspections, and additional state fire marshal inspections are conducted upon request of school

district officials, citizens, local officials, or the Department of Children, Families & Learning. The most common problems the state fire marshal encounters during these inspections include obstructed corridors and exitways, overcrowded assembly areas, unprotected corridors, vertical openings (e.g. stairways, shafts), and hazardous areas such as shops, labs, and boiler and equipment rooms, improperly constructed and separated storage and portable/re-locatable classroom buildings, and the use of school building levels above and below grade by preschool, daycare/latchkey, kindergarten and first and second grade students. M.S. 123B.51, subd. 7, and the MUFC and MSBC have restrictions and requirements for such usage in both new and existing buildings.

The state fire marshal issues orders to school districts for work that must be done to comply with applicable fire/life safety codes, and, if conditions warrant, may close portions of a school building for fire/life safety reasons. **It is expected that school districts will correct any outstanding state fire marshal orders in any school construction project proposal subject to review and comment.**

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>299F.011</i>	<i>1</i>
<i>123B.57</i>	
<i>123B.73</i>	
<i>123B.51</i>	<i>7</i>
<i>MINNESOTA RULES, CHAPTER</i>	<i>PARTS</i>
<i>7510</i>	<i>.3510-.3710</i>
<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>MINNESOTA UNIFORM FIRE CODE</i>	<i>STATE FIRE MARSHAL DIVISION</i>
<i>MINNESOTA STATE BUILDING CODE</i>	<i>BUILDING CODES AND STANDARDS DIVISION</i>
<i>EXISTING SCHOOL BUILDINGS: ADDITIONS AND REMODELING CONSIDERATIONS</i>	<i>STATE FIRE MARSHAL DIVISION, 1998</i>
<i>CAPITAL EXPENDITURE: HEALTH AND SAFETY REVENUE APPLICATION</i>	<i>DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1999</i>

(g) Minnesota Pollution Control Agency

Building owners and contractors are responsible for complying with state and federal regulations on hazardous substances that impact school construction and schools. Hazardous substances of concern in new school construction and/or renovation projects include the following:

(1) Asbestos: Minnesota Rules, Part 7011.9920 governs renovation and demolition projects, including written notifications and the proper removal, handling, and disposal of asbestos-containing materials.

(2) Mercury: M.S.115A.932 prohibits the placing of mercury or mercury containing devices into the solid waste stream, and M.S. 116.92 regulates the sale or purchasing of mercury-containing devices, handling of the material, proper labeling, removing devices from service, and thermostat manufacturing and purchase.

(3) Lead: M.S. 144 establishes lead hazard reduction programs and requires lead surveillance. Minnesota Rules, Chapter 4761 provides standards for lead in paint dust, bare soil, and drinking water, and establishes methods for lead abatement and lead hazard reduction. Minnesota Rules, Chapter 7025 establishes the procedures that a contractor shall follow to test for and remove lead paint from the exterior of any childcare building or school building. Minnesota Rules, Chapter 7045 requires the testing and disposal of lead waste generated from school buildings.

(4) Liquid Storage Tanks: M.S. 116.46-.50 requires underground and aboveground storage tanks to be registered with the Minnesota Pollution Control Agency (MPCA). M.S.115.061 requires the notification of MPCA of any SPILL that may cause water pollution. The MPCA number to call for spills, 24 hours a day, is 1-800-422-0798 in greater Minnesota and (651) 649-5451 in the Twin Cities area. Call (651) 297-8577 with questions about what is required for a site-specific cleanup.

Minnesota Rules, Chapter 7150 provides technical standards for underground storage tanks, and Chapter 7105 requires that regulated underground storage tanks be installed, removed, and replaced by an MPCA certified contractor. Call (651) 297-8367 with questions about underground storage tank rules and regulations.

Minnesota Rules, Chapter 7100 requires that aboveground liquid storage tanks have adequate safeguards and an MPCA permit, and PROPOSED Chapter 7151 provides standards and technical requirements for aboveground storage of liquid substances. If you have questions about aboveground storage tanks, call (651) 297-8679.

(5) PCB's (Polychlorinated Biphenyl's: Minnesota Rules, Part 7045 regulates the labeling, proper storage and disposal of hazardous waste PCB over 50 parts per million, including light ballasts.

For more information please call the MPCA at:

1-800-657-3864

TDD (651) 282-5332

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
115A.932	
116.92	
144	
116.46-.50	
115.061	
<i>MINNESOTA RULES, CHAPTER</i>	<i>PARTS</i>
7011	.9920
4761	
7025	
7045	
7150	
7105	
7100	
7151	

(h) Minnesota Environmental Quality Board, Environmental Review Program Board

M.S. 116D.04 Environmental Impact Statements, requires the review of major development projects, including school construction projects, which have or may have significant effects on the environment in order to minimize or avoid those effects. **When a review is mandatory or when a petition is filed, no final governmental unit decisions can be made to approve the project or grant any necessary permits until the review process is completed.**

(1) Minnesota Rules, Chapter 4410 specifies what projects must be reviewed and what are the review procedures. These rules may require the review of new school construction or building additions, or facilities such as athletic fields.

(2) There are two types of review documents that can be required under this program. The most common is the Environmental Assessment Worksheet (EAW), which is based on a six-page questionnaire issued by EQB. The purpose of an EAW is to disclose sufficient information about the project, its setting, and its potential environmental effects to allow the RGU to decide if the second, more rigorous, analysis, the Environmental Impact Statement (EIS), is needed. An EIS can also be mandatory for very large projects.

(2) Minnesota Rules, Parts 4410.4300-.4400 contains lists of "mandatory categories"; i.e., projects which because of their type, magnitude, or location require the preparation of an EAW or an EIS. A school construction project would most likely fit under the industrial, commercial, institutional facilities categories. The thresholds for a mandatory EAW and EIS in these categories are measured in square feet of gross floor space and vary according to the size of the city where the project would be located. Gross floor space includes the total area of all floors of all structures on the site, not including any space used for parking. Thresholds for project reviews are as follow:

<u>CITY POPULATION</u>	<u>EAW THRESHOLD (SQUARE FEET)</u>	<u>EIS THRESHOLD (SQUARE FEET)</u>
OVER 100,000	400,000	1,000,000
20,000-100,000	300,000	750,000
UNDER 20,000	200,000	250,000

A second EAW mandatory category that could potentially apply to a school construction project is the conversion of 80 or more acres of agricultural or naturally vegetated land (forest, prairie, natural vegetation) to more intensive land uses. This would include athletic fields and other "landscaped" areas at a school site. This category does not include the conversion of agricultural land within a Metropolitan Urban Service Area boundary. There are other mandatory categories that could apply to school construction projects under certain circumstances; a school district should review the total list under Parts 4410.4300-.4400 to make sure that none of the other categories fit their project. The most convenient way to review all of the categories is to use the table of categories printed in the "Guide to the Minnesota Environmental Review Rules," available from the EQB or through the EQB website.

(3) The rules require that review be initiated and conducted by a "Responsible Governmental Unit" (RGU), assigned by the EQB's rules based on the type of project. For school construction projects, the RGU would be the local unit of government that has planning and zoning jurisdiction at the project site (city, county, or township). The EQB's rules do not allow a school district to serve as an RGU.

If a review is required, the school district should contact the local governmental unit as soon as possible to initiate the review. Review can begin as soon as the project is sufficiently well defined to supply the information required by the EAW form. An EAW review typically takes about three to four months to complete, an EIS about a year. In either case, the process normally begins with the proposer (e.g. a school district) supplying the "data portions" of the EAW to the RGU.

(4) An EAW review can also be initiated through the citizen petition process. The law allows 25 or more citizens to petition for the preparation of an EAW if it is not mandatory. Petitions must be filed with the EQB, which then screens the petition for completeness and assigns it to the appropriate RGU. The RGU must decide within 30 working days of the receipt of the petition from EQB whether an EAW is warranted or not based on the evidence contained in the petition and otherwise known to the RGU.

The EQB staff provides information and assistance in determining if an EAW or an EIS is needed, and in properly completing the steps of the process. For information and assistance please contact staff at:

Environmental Quality Board
 Environmental Review Program
 300 Centennial Building, 658 Cedar Street
 Saint Paul, MN 55155
 (651) 296-8253
 1-800-657-3794 (voice mailbox)

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
116D.04	
<i>MINNESOTA RULES, CHAPTER</i>	<i>PARTS</i>
4410	
4410	.4300-.4400
<i>PUBLICATION</i>	<i>AUTHOR</i>
GUIDE TO THE MINNESOTA ENVIRONMENTAL REVIEW RULES	ENVIRONMENTAL QUALITY BOARD

(i) Municipal and Other Local Authorities

Under M.S. 462.352, subd. 8, municipalities have the authority to guide the future development of public facilities, including educational facilities and, under M.S. 471.468, the authority to approve local building project plans. School districts must check with and fulfill the review and approval requirements of any applicable municipal or other local authority (township, county, or regional) as appropriate.

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
462.352	8
471.468	

Part 1.06 School Bond Issue Referendums

(a) Question(s)

M.S. 475.52, subd. 5 authorizes school districts to issue bonds for school construction projects. M.S. 475.59 provides school districts with the discretion to submit a single question or two or more separate questions to voters on school construction or school site improvement project proposals.

Sources:

MINNESOTA STATUTES	SUBDIVISIONS
475.52	5
475.59	

(b) Referendum Timelines

School bond issue referendums are considered special elections under M.S. 205A.05, subd 1. Bond issue referendums may be held on the school district general election day. If not then, "a special election may not be held during the 30 days before and the 30 days after the state primary or state general election, or on the second Tuesday in December. In addition, a special election may not be held during the 20 days before and the 20 days after any regularly scheduled election of a municipality wholly or partially within the school district." A school district should work closely with municipal and county officials to coordinate election and public notice dates.

Source:

MINNESOTA STATUTES	SUBDIVISIONS
205A.05	1

(c) Resubmission of Question(s)

If a bond issue referendum is defeated by voters, M.S. 475.58, subd. 1A provides that a school district may not submit the referendum question(s) for the same purpose in the same amount to voters for at least 180 days from the date the previous referendum was held. If the same bond issue referendum question (s) is again defeated by the voters, a school district may not submit an identical question(s) to voters for at least one year from the date of the previous referendum.

Past practice has been that a school district is not bound by these timelines if the bond issue referendum question(s) dollar amount is at least 5% different than the previous referendum.

Source:

MINNESOTA STATUTES	SUBDIVISIONS
475.58	1A

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(d) Use of Bond Proceeds

M.S. 475.65 authorizes school districts to use bond issue referendum proceeds to pay all expenses reasonably necessary and incidental to the school construction or school site improvement project approved by voters. School districts may not use the bond issue proceeds or any left over proceeds after the completion of the project for any other purpose that was not a part of the project approved by voters, without a separate approval by voters. For example, if bond issue proceeds are left over from a new elementary school construction project, a school district may not use the proceeds to construct or improve other school district facilities unless those uses were specified in review and comment and bond issue referendum information made available to voters prior to the bond issue referendum. Otherwise, the left over bond issue proceeds must become part of the debt service fund of the school district.

Source:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
475.65	

SECTION II. PLANNING SCHOOL CONSTRUCTION PROJECTS

The purpose of Section II is to provide an overview of the process for planning school construction projects, and detail selected parts of this process. School districts and school facilities planning committees need to use this information to help understand the steps and time involved in the school construction project planning process, and the need to work out the details of the planning process in cooperation with project architects, construction managers, fiscal/other consultants, local officials, and other interested persons.

Part 2.01 Participants in the Planning Process

The participants involved in the planning process and their role(s) will vary significantly based upon the size and type of the school construction project and the school district. In a smaller project and/or smaller school district, the process will likely involve fewer persons and their roles will be broader. In a larger project and/or larger school district, the process will likely involve more persons and their roles will be more specialized. Smaller districts, or any district in a larger project, may have to procure more resources outside the school district (e.g. consultants, construction managers), or fewer district persons will have to assume broader roles. Participants in the planning process may include the following persons:

- school board member
- superintendent
- business manager
- specialized district staff
- principals
- teachers
- support staff
- students
- parents
- citizens
- architect, engineer
- construction manager, contractor
- educational consultant
- community survey consultant
- fiscal consultant
- legal counsel
- local or regional governmental officials
- Minnesota Department of Children, Families & Learning staff
- state or local regulatory agency staff

The school board and superintendent have the primary roles in shaping the school construction project planning process, and the final responsibility for the overall success of the project. The timely delegation of planning responsibilities and the careful oversight of the project are critical to project success. It is important to have an experienced educational facilities planner/designer on board early on to help lead the planning process (see Part 2.03).

Part 2.02 Planning a School Construction Project

The phases and steps listed below summarize major tasks in planning a school construction project. Each school district must determine the details of each step in the planning process, including the roles of the possible participants, and the desirable or necessary preliminary (e.g. strategic plan) and follow-up work for each phase/step. Project timelines will vary depending upon the size and scope of the project, the steps that overlap and tasks that are done separately or concurrently, and the time taken for each step. The assessment of needs and preliminary planning phases may take up to several years for larger projects such as a high school or multi-school campus, with up to an additional three years for construction. It is possible to plan small additions or remodeling/renovation projects in less than a year, and complete construction the following year.

To establish and maintain quality school facilities and a desirable learning environment for students, staff, and community users, an ongoing assessment of school facility needs and a program of public information about those needs is essential. A school facilities program will make it much less problematic for a school district to present and justify school facility improvement needs to the public, and to generate voter support for bond issues. Without such a program, school facility problems will likely increase and the school district community may become conditioned to a lower standard of school facilities, a less than desirable learning environment, and an overall lower level of community use and support.

The school construction project planning steps are placed in the following phases: (a) assessment of needs; (b) preliminary planning; and (c) final planning. Subsequent parts in this section provide more detail on selected steps in this process. For each step, possible responsible persons are identified.

(a) Assessment of Needs

1. Identify possible construction project issues such as the following:

- school site
- school facility
- program
- student enrollment
- technology
- building code
- accessibility
- health and safety
- community use/partnership
- school restructuring
- school district reorganization
- land acquisition

Obtain school board approval to form a school facilities planning committee with strong representation from parents/citizens, community users/partners, and school district staff. The committee needs to identify issues and related questions, and develop, discuss, review, and recommend school facility improvements and school construction project options.

Superintendent, school board, community users/partners, parents/citizens, and school district staff.

2. Gather data while assessing existing school facilities and programs. Project building, program, and technology improvement needs for students, staff, and community users/partners. Consider school/community survey and/or management assistance study of programs and facilities. Use architects and consultant(s) to help identify school program and facility improvement needs, and school construction project options. Committee, school district staff, consultant(s), and architect.

3. Discuss construction project delivery options. Interview and select architect, construction management firm, if desired, and other fiscal/other consultants as appropriate. Establish planning process goals, public information program, timelines, and criteria. School board, superintendent, and committee.

4. Consult with Department of Children, Families & Learning school facilities team if cost estimates for project exceed \$100,000. Schedule a visit to school district facilities by CFL school facilities staff. Superintendent or designate.

Timeframe: three to nine months+

(b) Preliminary Planning

1. After presenting and reviewing data with committee, school district community, staff, and school board, develop educational, community user, and partnership program facility design options which meet educational community learning/program needs and the goals of the school, school district, community users, and partnership programs. Involve local, regional, or State road/highway officials to assess any site access or safety issues. Committee, school board, architect, and school district staff.

2. Incorporate program designs into preliminary plan(s). Review preliminary plan(s) and cost estimates, financing plan (including debt service equalization, if any), tax impact, construction delivery method), move management, and ballot question(s). Secure school board and partnership program approvals. Committee, architect, fiscal consultant, superintendent, business manager, and school board.

3. If school construction project proposal exceeds \$400,000, prepare and submit package of information to CFL for commissioner review and comment. If project uses entirely health and safety and/or school district general aid and levy revenues, consider applying to commissioner for exemption from review and comment requirements. Superintendent or designate.

Timeframe: three to nine months+

(c) Final Planning

1. Plan and develop bond issue referendum information materials, schedule building tours, public meetings, etc. Finalize ballot questions and bond issue referendum date. Coordinate election date with local officials. Committee, superintendent, and school board.
2. Publish commissioner review and comment 20 to 60 days before referendum. Superintendent or designate.
3. If referendum passes, coordinate architect, committee, staff, and administrative development and review of detailed plans, specifications, and project budget. If referendum fails, consider options for resubmission. Architect, committee, superintendent, business manager, and school board.
4. Develop, review, and secure school board approval of final plans, specifications, and construction documents. Submit final plans to Building Code Division, Health Department, CFL (optional), and other State, regional, and local agencies as required. Secure written approvals and agreements. Superintendent or designate.
5. Plan for the timely sale of bonds and securing of proceeds for project payments. Advertise for bids and award contracts. Set construction project schedule. Business manager, fiscal consultant, architect, superintendent, and school board.
6. Project construction. Supervise, monitor change orders, budget. Finalize plan to move to new or renovated facility. Architect, contractor, and/or construction manager, business manager, and superintendent or designate.
7. Complete construction. Complete and submit final reports to school board, CFL, and other State, regional, and local agencies as necessary. Conduct final inspections, payments, and secure occupancy certificate. Move to and/or occupy facility. Conduct post occupancy evaluation. Architect and/or construction manager, business manager, committee, and superintendent or designate.

Timeframe: twelve to twenty-six months+

Part 2.03 Selecting a School Architect and Other Consultants

A school architect, contractor or construction manager, fiscal consultant, and other needed consultants are key members of the school facilities team that will plan and implement a school construction project. The importance of the careful selection of school facilities team members cannot be stressed enough. Though the selection process outlined below is about selecting an architect, a similar process could be used to select other key members of the school facilities team.

A school district first needs to consider when to involve an architect, construction manager, fiscal consultant, and other needed consultants as key resources and advisors in the planning process. There are definite advantages to the early involvement of the architect and other key members in the planning process. A consultant, for example, can help a school district study and review broad questions such as grade or school district reorganization options. An architect and a contractor or construction management firm can provide valuable assistance in helping the school district assess existing school facilities, cost out facility options, and discuss different construction project delivery methods for the school facilities planning committee and/or school board to consider. A fiscal consultant can help determine the tax impact of facility options under consideration, including the amount of debt service equalization for which the school district may qualify. The architect and other key members can help the school facilities committee identify and realistically assess facility options under consideration.

Major steps in the selection of an architect include the following:

1. Form a selection committee. This could be the school facilities planning committee and/or the school board assisted by the Superintendent and district staff. Consideration should be given to consulting with or adding other persons capable of assessing an architect's capabilities to the selection committee.
2. Invite applications from interested architects. This involves publishing a description of the proposed school facilities needs and/or construction project proposal, time lines, selection criteria and procedures, and notifying interested architects through the school district newspaper and other appropriate channels.
3. Review and screen applications. Determine which architect in the firm will be the project architect; i.e., the architect that will work most intensively with the school district, and the architect's support team. Selection criteria may include the following: personal qualifications and school construction experience of the architect and the support team; ability to complete a project within the planned budget and timelines; ability to understand project concepts and possible project partnerships; creativity and flexibility in design; ability to relate and work with the committee, district staff, and other project team members; and the architect's role in the construction project phase.

4. Interview final architect candidates. Interview three to five architect firms and give each a chance to make a presentation to the interview committee. When reviewing and comparing estimated project costs from competing architect firms, caution is advised. Make sure to include all project costs, including architect, fiscal consultant, construction management, consultant fees, and furniture, fixtures, and equipment costs, and that the quality of construction materials is the same when comparing project cost estimates. Visit school districts that have worked with the architect on a project, and review the architect's designs and specifications as part of the selection process.
5. Select the architect and negotiate the terms of a contract. Distinguish between basic architectural services and additional services that an architect may perform. Basic services include schematic design and design development, preparing construction documents and participating in bidding/negotiations, and construction contract administration. Additional pre-design services include existing school surveys and site analysis, and post-construction and supplemental services such as an energy survey. Clearly specify the services to be performed by the architect in the contract. Review the contract to see that the responsibilities and relationships of the architect, contractor(s), construction manager, and school district are clearly understood. Secure final school board approval only after a review of the contract by the school district legal counsel.

A direct appointment of an architect may be appropriate if a long and satisfactory working relationship has been developed through previous school construction projects.

The AIA Minnesota has materials from The American Institute of Architects regarding the selection of an architect, AIA owner-architect agreement forms, and related materials. AIA Minnesota annually publishes a list of Minnesota school architects. For further information please contact:

AIA Minnesota
275 Market Street, Suite 54
Minneapolis, MN 55405
(612) 338-6763

Sources:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>YOU AND YOUR ARCHITECT</i>	<i>THE AMERICAN INSTITUTE OF ARCHITECTS, 1987</i>
<i>BUILDING RELATIONSHIPS</i>	<i>AIA, 1990</i>
<i>DIRECTORY OF AIA MINNESOTA FIRMS</i>	<i>THE MAGAZINE OF AIA MINNESOTA, MAY/JUNE 1998</i>

Part 2.04 Assessing Existing School Sites and Facilities

A school district needs an ongoing program of assessment of existing school sites and facilities in order to identify school facility improvement issues, alternative means of addressing those issues, and to maintain a quality educational environment for students, staff, and community/partnership users. Keep the educational community well informed of school facility improvement needs and actions taken to maintain a quality educational environment. This program needs to be a part of a school district's strategic planning process as discussed in Part 2.02.

A school district that does not regularly assess its existing school sites and facilities, take appropriate actions to maintain quality facilities, and keep the educational community informed will likely build up deferred maintenance issues, and the quality of their school facilities will deteriorate. This approach will likely make it more difficult for a school district to successfully implement major facility improvement or replacement projects.

Assessing school facilities involves looking at such areas as the school site, program, support, and community use/partnership spaces. School district staff will need to assist community members in understanding daily school operations and how they impact the needs of program, support, and community use/partnership spaces. A school district will likely need to employ a consulting architect, engineer, or other specialist(s) to properly and thoroughly assess school sites and spaces, technology and equipment, building structure and mechanical/electrical systems, and accessibility and health and life safety issues.

Before beginning a school facilities assessment, a school district needs to determine facility and instructional area enrollment capacities, and project individual program enrollments. It is important to make projections based not upon present enrollments, but upon what enrollments will likely be in new/renovated facilities.

A school district may determine the capacity of a facility as follows (classroom = teaching station):

$$(\# \text{ of classrooms}) \times (\text{capacity of classrooms}) \times (\% \text{ utilization of classrooms})$$

In an elementary school, a school district may program general classrooms for a desirable class size (e.g. 15 students at primary level, 20 students other grades) or at their capacity (e.g. 30 students). For a middle or high school, the variety of classrooms or teaching stations (general classrooms, small group and large group areas, science lab, gymnasium, technical education classroom, lab, or shop) is usually greater, necessitating more separate calculations for a wider range of different class size capacities.

To determine how many classroom spaces or teaching stations are needed for a program or class (e.g. science or English), use the following formula:

$$\frac{\text{Program or class enrollment}}{\text{class size}} = \frac{\# \text{ sections}}{\text{class periods per day}} = \# \text{ of classrooms needed}$$

Figure classroom utilization as the number of class periods minus one (for teacher preparation), or at 80% or whatever percentage scheduling experience proves to be the utilization of a classroom or instructional area. For example:

$$\frac{225 \text{ student enrollment}}{27 \text{ students per class}} = \frac{8.3 \text{ sections}}{6 \text{ periods per day utilization}} = 1.4 \text{ classrooms needed}$$

School districts need to design a school facilities assessment to help them determine what they have (inventory), judge its condition (adequacy), and help decide what facility improvements (new construction, addition, remodeling, or renovation) are needed. An assessment needs to determine whether a school facility meets current building, health and safety, and accessibility codes.

Assessors should understand that one important variable (e.g., poor location, small room size, or inadequate ventilation) might make an otherwise adequate classroom or lab less than adequate. Comments and assistance from building or district maintenance staff, principals, teachers, and architects and engineers is necessary to improve the quality of assessors' judgments.

To assess support spaces, see Table X in Part 3.08 (a) for general support space guidelines. Ask school staff to identify support space needs and consult with an architect before specifying those spaces in the plan for the facility.

Part 2.05 Projecting Educational Program and Service Space Needs

Projecting what new or expanded programs and services need to be accommodated in a school facility can be a very difficult task. Few school facilities are constructed with space set aside for growth, and many lack adequate storage, office, and conference room spaces. Many new or renovated schools report that they are in need of additional spaces within two years of occupying the new/renovated facility.

What is clear is that schools need spaces for program and service as well as student enrollment growth. Listed below are a sample of school programs and services that have been added or expanded in scope since publishing the 1988 Guide:

graduation standards	basic skills tests
preschool/early childhood program	day care/latchkey program
coordinated/comprehensive school health	family service collaboratives
breakfast program	community nutrition program
parent involvement program	community meeting rooms
student houses	student commons
block scheduling (3-4 period day)	team learning area
small group area	studio classrooms
magnet programs	refugee program
after-school enrichment program	alternative programs, school-within-a-school
Internet technology	decentralized computer labs
networking, cable lines	distance education/television studio
life time fitness	fitness center
girls' athletics	fieldhouse
community recreation	public/school library
lifework development	school-to-work
career counseling center	technical education labs
mentorships	service learning
abused children	emotional behavior disorders
at-risk students	male responsibility
attention deficit disorders	autism
violence prevention	behavioral intervention
drug prevention	adolescent pregnancy
English as a second language	limited English proficiency
accessible classrooms, labs	special needs restrooms
energy management	recycling

How many school districts were able to adequately plan for these new or expanded programs and services? Provide additional or modified spaces in a timely manner? Meet the added requirements these programs and services place upon a facility's mechanical systems? Avoid stress upon the learning environment, particularly in older, less flexible facilities? Will this continuing program and service expansion continue in the years ahead? It would be hard to imagine that the trend of program and service expansion of the last 30-40 years will not continue.

School districts need to stress the need to plan for the continuing expansion of programs and services in their public information program. Flexible, convertible, expandable, and multipurpose spaces should be an integral part of any school facility planning program. Although specific programs and services that will need to be expanded may not be predictable, the fact that there will be a need for additional spaces for expanding programs and services is a safe prediction. School facility planning must be undertaken with present and future space considerations utmost in mind.

Part 2.06 Renovate an Existing School or Build a New School?

The answer to this key question is not clear and simple, and it requires a detailed and time-consuming analysis of many factors. The commissioner must consider both the economic and the educational advisability of a proposed school construction project; hence, both an economic and educational perspective on what is best educationally for students and economically for taxpayers of the community and the state are necessary.

The more "yes" answers there are to the following questions, the greater the likelihood that a school facility in its entirety is not adequate for current student, staff, program, and community needs, and needs to be replaced:

- ◆ Does the school district have too many school facilities for the numbers of students?
- ◆ Are there health and safety issues in connection with the school site?
- ◆ Is it very difficult or impossible to solve school site issues such as a lack of outdoor physical education/athletic and/or parking spaces by purchasing adjacent properties?
- ◆ Is the school site too small to meet current needs?
- ◆ Are their major exterior issues such as leaking roofs, groundwater penetration, sagging walls, mold, and brick in need of tuckpointing?
- ◆ Are major portions of the school greater than 50 years old and/or in poor condition?
- ◆ Are there many additions to the school over the years?
- ◆ Do the school additions separate instructional and support spaces that should be clustered together?
- ◆ Are major portions of the school inaccessible to students with disabilities and adults?
- ◆ Do major portions of the school have health and safety issues?
- ◆ Are general classrooms, specialized areas (labs, shops, music, art, physical education, and special education), and support spaces insufficient for current needs?
- ◆ Are there many load-bearing walls, wood floors, and other design features that make renovation of the school difficult and expensive?
- ◆ Are the mechanical, electrical, plumbing, and heating, ventilation, and air conditioning systems in poor condition?
- ◆ Is lighting insufficient and/or do the windows, ceilings, and walls need replacement?
- ◆ Is wiring for technology costly because of the age and/or design of the school?
- ◆ Is the student enrollment either too small or too large for the capacity of the facility?
- ◆ Are school operational and maintenance costs high?
- ◆ Are community use spaces few or insufficient for current needs?
- ◆ Are the high costs of renovating the school, the unpredictability of renovation costs, and the disadvantages of continuing to use it as a school clear and understandable?
- ◆ Are the concerns of supporters of the school centered on issues other than how the facility can best improve student learning and teaching, and help prepare students for their future?
- ◆ Does the school have good potential for reuse? Is there a viable reuse option for the school?
- ◆ Are the reasons for replacing the school and the advantages of building a new school clear and understandable?
- ◆ Does the school district have the bonding capacity to build a new school?

The facilities and organization team uses the architectural guideline that when the estimated costs of renovating/improving a school facility approach 60% of the cost of replacing the facility, a school district needs to replace the facility. Architects estimate that the construction cost of a facility is one-seventh to one-tenth of its cost during its life cycle. The remaining costs of a facility are operations and maintenance costs.

If the need to replace the school facility is not relatively self-evident, it may be necessary for school staff and consultants to assess existing school facilities and sites in detail using the criteria outlined in Part 2.04. A consulting architect or engineer will need to provide a detailed analysis of the estimated costs for necessary and desired renovations/improvements and develop comparative life cycle, cost-benefit analyses for all school construction alternatives under consideration. The timing and scheduling of a school construction project also has cost implications due to the changing costs of equipment, materials, and labor. In general, the greater the gap between the present value of the renovated facility versus a replacement facility, as well as the actual versus desired site size, the less advisable it is to expand on the existing facility and site.

Part 2.07 Selecting a School Site

Part 1.01 specifies the legal authority for school districts to select, purchase, and improve school sites. Selection of a school site may be part of a proposed school construction project subject to the review and comment requirements outlined in Part 1.05. Adequate school site size is an important consideration in the commissioner's review and comment on any new/renovation school project proposal. School districts selecting a school site should be guided by the criteria for site selection described in Part 2.07.

School architects and superintendents report that user demands on school sites have increased dramatically in the past decade (see Part 2.05). Existing, even newer, school sites are often not of sufficient size to accommodate the increasing demand for outdoor physical education, athletic, and community recreation spaces, access roads, and student and community user parking. Changing needs and requirements require the continuing improvement and renewal of school sites. It is very important that any school site selection consider future expansion needs that will impact the site.

School districts consider improving an existing school rather than building a new school because of positive feelings for the old school and its central location, the cost of new school construction, the desire to keep school taxes down, and issues surrounding the selection of or the availability of a new school site. If considering renovating an existing school, understand that a renovated school may still be on an inadequate site, making it very difficult if not impossible to expand or acquire additional land to accommodate new programs or solve site issues.

(a) Site Selection Process

A new school site selection process needs to involve the following steps:

1. Specify the spaces needed for current school and community programs and for anticipated program expansion.
2. Form a school site selection team composed of school and district staff, parents, students, citizens, school-community partners, and local officials (e.g. city and county planners, park board).
3. Employ or work with consulting architects, engineers, local or State traffic/road officials, real estate specialists, and appraisers to evaluate possible school sites and the costs of site development.
4. Research and review local and regional planning and zoning requirements and land costs.
5. Convene public meetings to discuss impact of school construction.
6. Review and apply the school site selection considerations specified in (b) below, rank sites, and recommend possible site(s) to the school board.

(b) Site Selection Considerations

Selecting a new school site is different than assessing an existing school site in an existing neighborhood, where school site issues may already exist. Selecting a new school site in a suburban or inner-city setting is different than selecting a site in a rural setting because of unique local issues that may impact school site possibilities and the final decision.

The selection of an adequate school site with expansion space will accommodate current and future educational programs and services, expanding student enrollments, increase community use of schools, and promote school-community partnerships. Conversely, continuing use of or the selection of an inadequate school site with limited or no expansion possibilities will create ongoing problems as program development, student enrollment, community use, and school-community partnership issues arise. Space accommodations in light of these issues will put additional stresses on an overcrowded school site and facility. A school site selection form or checklist may be put together using new school site considerations, including the following:

(1) Size. Allow for current site size needs and future expansion possibilities. Acquire contiguous acreage whenever possible, and encourage the joint use of land in partnership with other local public agencies and private users. The basis of following school site size guidelines are the experiences of school districts, school architects, and school facility planners in Minnesota and other states. **School site size guidelines refer to usable acres. Do not include wetlands or land for on-site water, sewer, or zoning setbacks as usable land for calculating acreage to meet the school site guidelines. The school site size ranges specified below allow for schools planning different grade organizations, student enrollment capacities, and current and future program, support, community use/partnership, and program expansion spaces for the school site and school.**

TABLE I
SCHOOL SITE SIZE GUIDELINES

SCHOOL LEVEL	SITE SIZE
ELEMENTARY SCHOOL	10-15 ACRES +
K-8 OR MIDDLE LEVEL SCHOOL	25-35 ACRES +
K-12 SCHOOL OR SMALL HIGH SCHOOL	35-40 ACRES +
LARGE HIGH SCHOOL (>2,000 STUDENTS)	60 ACRES +
CAMPUS (TWO OR MORE SCHOOLS)	COMBINE SITE SIZES +
ALL SCHOOLS	PLUS ONE ADDITIONAL ACRE FOR EACH 100 STUDENTS OF ESTIMATED STUDENT ENROLLMENT AND COMMUNITY USE/PARTNERSHIP PROGRAM CAPACITY, INCLUDING POSSIBLE ADDITIONS

For example, plan 15-20 acres for a 500 student elementary school, 47 acres for a 1,200 student junior high school, 43-48 acres for an 800 student high school or K-12 school, 80 acres for a large high school, and 65-70 acres for a campus with a separate 1,500 student middle level school and a 500 student elementary school.

Special local circumstances such as the unusually high cost of available land and the lack of suitable sites may preclude school districts from meeting the above site size guidelines. For example, in an urban or other unique setting (Minneapolis, Saint Paul, Duluth, Rochester, Winona, etc.) the lack of available land and suitable school sites may necessitate a multi-story school on fewer acres, while sharing other spaces (e.g. playground, athletic) with other public agencies or private owners.

(2) Location. The school site should be located near the following:

- center of community or school district;
- student population zone or growth area;
- community resources (especially parks) and potential school-community partnership sites;
- major connecting roads and bus lines that afford easy access to the site;
- site expandable areas (preferably include in site purchase); and
- bus routes limiting travel time for students, whenever possible.

(3) Health and Life Safety. Avoid locations with nearby, high-density freeway, commercial, or commuter traffic flow. Avoid noisy, congested, or environmentally hazardous areas (e.g., near heavy industry, sewage or chemical plants, major highways, power and gas lines, and railroads). See section (d) below for planning for school site safety and access.

(4) Topography, Soil. A site should be gently sloping with an elevation and contour that insures good drainage away from the school and site, and soil test borings need to assure that the subsoil provides a good base for footings and foundations. Extensive level areas are needed for outdoor activity areas, access, and parking. Uneven, wooded, and wet areas may be useful for nature/environmental study. Avoid lowlands and extensive wetlands.

(5) Present/Previous Use. The site should be compatible with land use plans. If the site has or is presently heavily used, an environmental assessment of the site to check for contamination may be necessary. Check aircraft noise zones, if applicable. If the demolition or relocation of an existing business or housing is necessary, procure an estimate of the cost of demolition/relocation, and any additional site preparation costs.

(6) Zoning, Utilities. Utility lines and fire protection service should be nearby and not excessive in cost. Zoning changes or existing easements should not be potential problems. Check adjacent-area zoning for possible future construction and land use not compatible with a school neighborhood area. Secure written approvals or agreements as appropriate.

(7) Cost and Availability. Determine initial and potential long-term costs. Secure appraisals and review methods of site purchase.

Source:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>THE SCHOOL SITE: LAND FOR LEARNING</i>	<i>NORTH CAROLINA DEPARTMENT OF PUBLIC INSTRUCTION, 1994</i>

(c) Improving an Existing School Site

Planning an addition to a school facility on an existing, adequate site has many advantages. Construction cost efficiencies are achievable if existing building systems and support spaces (e.g. lunchroom, gymnasium, media center) have the capacity to provide the same level of service for additional spaces, and disruptions due to construction may be kept to a minimum.

However, there are cases when a building addition, no matter how well planned, may not be economically or educationally advisable, given the current configuration of the facility. Repeatedly adding on to a school facility on an inadequate site creates a maze of building additions, while further stressing the site and reducing spaces for outdoor activities, parking, and convenient access.

Select a site for a school addition to satisfy the considerations discussed in this part, and the assessment of needs procedure as discussed in Part 2.02. This includes assessing existing sites and facilities, identifying space needs and projected costs, consulting with the school facilities team, and consideration of other alternatives. Develop a detailed cost benefit analysis of adding on to the old facility and constructing a new facility.

In any school renovation/addition project proposal, every effort needs to be made to acquire adjacent properties if current school site size guidelines are not met. Any school renovation/addition project proposal must address existing school site issues (e.g. lack of outdoor activity space, limited parking). If the deficiencies of the school site and facility are numerous, a school renovation/addition project will likely be judged not to be economically or educationally advisable.

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(d) Planning for School Site Access and Safety

New schools are more often being built adjacent to busy streets and highways, necessitating increased attention to school site access and safety issues. There may have to be more and longer turn lanes for cars and buses, and stop signs and walkways in potentially hazardous areas. This will impact the cost of the project, and school officials need to determine what portion of the cost of these improvements the school district will need to assume. **School site access and safety concerns necessitate consultation early on (before a review and comment submittal) with street and highway planning officials at the local and/or State level for the purpose of providing for adequate and safe school site access.**

Safe and convenient access to the school for students, parents, visitors, and community users must be a priority in designing a school site. Student walkways, bus unloading or parent/student drop-off areas, special needs student drop-off, delivery, parking for students, staff, visitors, and community users, outdoor activity area access for students, and entrances and parking areas for community partnership users should be separate, distinct, and well-marked to avoid potential problems. One way traffic flow is advised wherever possible. It is strongly advised to locate structures such as bus garages off site to avoid potential problems that buses backing up onto school sites and student walking areas could create.

The "Planning School Sites For School Bus Safety" section in the latest edition of the National Standards for School Buses...contains more detailed guidelines on planning school sites for safety and access. Please contact the Missouri Safety Center @ (816) 543-4830 for the publication.

The Minnesota Department of Transportation will also assist school districts in planning student, vehicle, and community user access to a school site. In Minneapolis and Saint Paul, city officials assist the school districts with school site access issues. In most areas then, MNDOT District Offices will act as a coordinating agency for local school site access and safety planning using State, County and/or local streets and highways. For further information please contact:

Director
Office of Traffic Engineering
(651) 582-1041

Source:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>NATIONAL STANDARDS FOR SCHOOL BUSES AND SCHOOL BUS OPERATIONS</i>	<i>NATIONAL ASSOCIATION FOR PUPIL TRANSPORTATION ET AL</i>

Part 2.08 Building Public Support for a School Bond Issue Referendum

(a) Trends in School Bond Issue Referendums

The rate of successful school bond referendums in Minnesota has been highly variable over the past 40 years. Factors influencing passage rates include the strength of the state and local economy, current educational issues that impact school facilities such as asbestos, accessibility, technology, and changing program needs, and the age and condition of local school facilities. At times passage rates have been as high as 75%, at others as low as 33% of the proposed referendums.

In the 1990's, there has been a high rate of school building construction in Minnesota because of the need to replace/update aging facilities, changing classroom and building technology, accessibility and state fire marshal requirements, increased debt service equalization payments by the state, and good economic times. The high point of the school construction boom in Minnesota may have been in 1994 and 1995, as illustrated by the following data:

TABLE II
SCHOOL CONSTRUCTION TRENDS

YEAR	SCHOOL CONSTRUCTION PROJECTS > \$400,000 PROPOSED	BOND ISSUE REFERENDUM QUESTIONS PASSED/PROPOSED --PERCENTAGE PASSED	SCHOOL CONSTRUCTION PROJECTS AUTHORIZED
1994	\$994.4 MILLION	31/54--57.4%	\$580.8 MILLION
1995	\$1.0 BILLION	38/67--56.7%	\$569.4 MILLION
1996	\$766.9 MILLION	44/67--65.6%	\$467.3 MILLION
1997	\$612 MILLION	43/65--66.2%	\$449.3 MILLION
1998	\$552.4 MILLION	32/49--65.2%	\$420.8 MILLION

In the 1990's, passage rates have been steadily increasing to nearly 2/3 of the proposed referendums, historically a high rate of passage. Increasing use by school districts of alternative means of financing school facilities projects such as alternative bonding, lease-purchase, and the use of district capital funds have reduced the percentage of projects that must be passed by voters in bond issue referendums.

(b) Suggestions for Building Public Support

Building public support for a school bond issue referendum is an increasingly challenging task for school districts. School district communities are made up of many constituencies, and most often a majority of voters do not have children in school. A school district needs a long-term plan to keep the citizenry well informed of school facility needs, and creative partnerships with community organizations to enhance school construction project proposals. If the school community is knowledgeable about school district's facility needs, and school construction projects propose partnerships which increase citizens' and community organizations' use of school facilities, chances of passing school bond issue referendums will improve. The opposite approach of relying on "crash programs" of public information on school facility needs, and proposing traditional school construction projects centering on the needs of the school will likely make the passage of school bond issue referendums more difficult to achieve.

Suggestions on how to successfully pass school bond issue referendums were derived from feedback from Minnesota school districts and updated national sources. **There is no consensus on the one way to pass a bond referendum—school districts may successfully employ a variety of strategies.** Each school district community is unique, and approaches, strategies, and techniques that pass a bond issue referendum in one community at one time may not work in another community or in the same community at a different time. Bond issue referendum campaigns must be made to fit the history and needs of each community.

A school bond issue referendum is part of the overall planning process described in Part 2.02 Planning a School Construction Project. Consider the following suggestions as a compendium of actions that a school district needs to consider in addition to those made in Part 2.02:

1. Establish an ongoing school facility assessment program as part of the school district's overall strategic planning. Regularly communicate school facility issues and improvement needs to the school community through a public information program. Include comments from staff, citizens, and consultants.
2. Stress school facility issues and improvement needs that relate to the vision and mission of the school and school district to improve student learning and teaching, develop and expand programs, increase community use of school facilities and school-community partnerships, solve health and safety, accessibility, and building code issues, and increase cost efficient operations.
3. Research the history of previous school bond issue referendums (including voting patterns), identify constituencies and voter interests, and understand the present economic conditions of the area and community. Identify community opinion leaders, support and opposition groups, as well as issues that will generate support and controversy. Consider a community survey and focus groups to help determine community member's level of understanding of school facility needs, issues, and support. Develop appropriate strategies, action plans, and timelines.
4. Build upon staff involvement in an ongoing school facilities assessment program. Generate school board and staff support for school bond referendum proposal. If the school board and staff are divided, reassess the proposal and/or the advisability of proceeding with the referendum. The school board should be in unanimous or near-unanimous support of any school bond issue referendum proposal.
5. Study community voting patterns to identify the best time of the year for an election (e.g. may want to avoid certain months or days of the month). Check election laws and local elections dates for possible election dates.
6. **Important: school districts cannot lobby for a YES vote. Taxpayer dollars may not be spent to secure a YES vote. School districts must present balanced and objective information to voters.** Parents and citizens need to raise funds for and coordinate and lead a campaign to approve the bond issue referendum, including any activities that encourage a "yes vote".

7. Plan to use a variety of media and presentations with community and community groups. A longer overview piece may serve as the foundation for all other shorter information pieces, and be the official information resource for the media and community groups. Keep messages and materials short, accurate, informative, and consistent. Every information piece needs to reflect a similar rationale and the same figures. Review all information pieces with care prior to distribution.
8. Tailor and target messages to various constituencies in the community. Address all questions that voters are asking. Focus on what will happen with a YES and a NO vote. The campaign should be short in length (1-2 months), positive, and low key. Circumstances may require a longer, more highly visible campaign, in which case planning for such a campaign may take considerably longer (6-12 months).
9. Identify, stress and repeat themes/issues such as a need to provide appropriately-sized and technologically updated classrooms, labs, and support spaces for students, staff, and community users, bring facilities into compliance with health and safety, accessibility, and building codes, and develop or enhance school-community partnerships.
10. Develop a list of speakers for community meetings. Make an effort to hold meetings in neighborhood and community settings, as well as in school settings. Maximize opportunities for esteemed teachers to speak about the project proposal. Establish a bond issue referendum "hot line" to provide up-to-date and accurate responses to voter questions. Schedule school board members and administrators to be available to answer questions on the project proposal.
11. A parent/citizen committee should attempt to identify "yes voters" through phone surveys and mailings. Establish a "yes vote" target and concentrate efforts on getting out "yes voters" versus trying to persuade "no voters". Contact "yes voters" shortly before election, reminding them to vote. Typical "yes voters": ages 18-29, parents of school children, absentee voters, staff and staff contacts, women living in the area for 2-5 years, members of minority groups, college graduates, business and professional people, and other school-community partnership groups (e.g. school-community recreation facility users, adult education students, school technology users).

A checklist of actions to take to increase the chances of a successful referendum may include the following:

- ✓ complete a thorough facility assessment;
- ✓ increase community awareness of school facility needs and issues;
- ✓ develop school district vision-mission-goals, and community understanding of the same;
- ✓ acquire knowledge of community, constituencies, and voting patterns;
- ✓ create strong, representative citizen advisory committee;
- ✓ conduct extensive research and use data to support proposal(s);
- ✓ consider a variety of facility project proposals;
- ✓ develop strong school board support;
- ✓ encourage and develop strong citizen leadership;
- ✓ develop school-community partnerships as part of proposal;
- ✓ provide accurate tax impact data;
- ✓ develop positive referendum theme(s), yet tailor messages to various constituencies;
- ✓ address all voter issues, even if they seem trivial;
- ✓ encourage communities/constituencies within school district to work together and be supportive of each other; and
- ✓ develop sufficient and inspiring referendum campaign.

A successful school bond issue referendum will normally require a well-organized effort by a dedicated team of citizens and school persons. If a school bond issue referendum fails, carefully review the school construction project proposal as well as the bond issue referendum campaign prior to initiating another proposal and campaign.

Part 2.09 Project Financing, Delivery, and Move Management

(a) Financial Planning Process

Financial planning for a school construction project is an integral part of the overall planning process as outlined in Part 2.02. Financial planning involves the following steps:

1. Determine the net debt limits of the school district, not to exceed 10% of the market value of taxable property situated within the school district (M.S. 475.53, subd.4). Separate provisions apply to school districts located wholly or partly within cities of the first class (subd. 5);
2. With architect and/or construction manager and fiscal consultant assistance, determine the estimated cost of school construction project proposal. Include legal, fiscal, architect, management, and other consultant fees, as well as all other project costs;
3. Review alternative means of financing construction project, including the use of operating capital revenues, school bond issue referendum, capital loans, facility bonds, and other sources of funds (see Parts 1.02-.04);
4. As part of a school bond referendum proposal, the public information campaign needs to include data and information on the tax impact to school district property owners;
5. After a successful bond referendum, issue bonds. Assistance from legal counsel and a fiscal consultant is necessary to secure a bond rating, advertise for and sell bonds and secure project bids, and take delivery of bond proceeds;
6. Advertise for bids, accept lowest responsible bidders, and receive contractor performance bonds. See M.S. 123B.52 and M.S. 471.345 for information on contracts and bidding procedures; and
7. Through the business manager or a fiscal consultant, reinvest bond referendum levy proceeds until funds are needed to pay project contractors.

In considering options for school construction projects, be wary of any ball-park or unwritten project cost estimates that lack supporting details, even from supposedly well-informed persons (e.g. "that project shouldn't cost more than \$... a square foot," or "...can do it for no more than \$... a square foot"). Such cost estimates may leave out substantial costs such as computer networking/infrastructure, library shelving, lockers, and bleachers, furnishings and equipment, grading, site work, lighting, and outdoor facilities, permits and assessments, professional fees, and project financing expenses, and may mislead school facilities planning committees. New construction will contain cost items that renovations and additions will not, and vice versa. Consider only written, detailed cost estimates and review them carefully.

In estimating school construction project costs and presenting them to the public, it is important that the cost estimates not increase or change often, or public mistrust will develop. The result of adverse public reaction to project cost figures could well be a scaling down of the project proposal to the point where student and learning program needs are not adequately met.

Cost figures for recent school construction projects are available from the Department of Children, Families & Learning, and school districts should consult with other school districts undertaking similar projects. **School districts must determine precise project cost estimates working with an architect/construction management/fiscal consultant team after developing preliminary plans and detailed specifications for the project. Such cost estimates may then be presented to the public with confidence.**

Sources:

MINNESOTA STATUTES	SUBDIVISIONS
475.53	4-5
123B.52	
471.345	

(b) Project Delivery Methods

There are several school construction project delivery methods available to school districts. School districts need to employ a project delivery method that responds best to their project size and complexity, district priorities, management capabilities, desired approach to risk, and desired level of involvement in design and construction decisions. Highest quality, lowest cost, and the shortest project completion time are also important considerations. When comparing project delivery methods, it is important to understand that different costs and fee structures (e.g. single or multiple contracts, contractor(s), architect, and construction management fees) and document and payment approval requirements may be associated with each delivery method. It is important for the school district owner to use recognized AIA architect/construction manager contract forms in case of possible future litigation.

The school construction project delivery methods available to Minnesota school districts are single or multiple prime general contracting, and agency construction management. Minnesota statutes do not currently permit other delivery methods, including design-build and construction management at-risk, for school construction projects. All of the delivery methods involve construction project management, but who manages the project and how and when they become involved in a project varies considerably. These delivery methods are briefly described below:

1. SINGLE OR MULTIPLE PRIME GENERAL CONTRACTING

The architect and the school district owner form a team during the assessment of needs or preliminary planning phases, and the architect designs the project with input from the owner. The architect advises the owner prior to construction by providing estimates of construction cost, and assists in the bidding process and preparation of construction contracts. Typically, the school district awards one to five construction contracts (e.g. general, electrical, and mechanical) to the lowest responsible bidders.

During construction, the architect serves as the agent for the owner. The architect provides quality control by observing/inspecting construction to ensure compliance with the contract documents by contractors, interprets contract documents, acts as a conduit for owner-contractor communications, evaluates claims made by contractor(s), initially resolves disputes between the owner and contractors, and signs off on issues certificates of payment.

The general contractor(s) assumes and manages risk, directly employs subcontractors, and is responsible for the conformance of construction to the contract documents. The legal construction contract is between the general contractor and the school district owner. The architect has a contract with the school district owner and has no contractual ties to the general contractor.

The major difference between single and multiple prime general contracting is in the coordination of construction work. The coordination of construction work, but not the construction or the direction of construction or trade contractors, may be assigned to one of the contractors, the architect, or a construction manager if the firm has the resources and capacity to absorb the increased risk.

2. AGENCY CONSTRUCTION MANAGEMENT

The agency construction manager (ACM), architect, and school district owner form a team during the assessment of needs or preliminary planning phases. The architect designs the project with input from the owner. The ACM advises the school district owner prior to construction by providing estimates of construction costs, prepares the project schedule, coordinates various activities (e.g. ordering and delivery of materials), assists the owner in the bidding process and the preparation of construction contracts, and provides overall construction management. The ACM bids to prime contractors (20 to 60 prime contracts) and the school district awards contracts to the lowest responsible bidders.

The ACM advises the owner and architect during construction. The ACM provides scheduling and coordination (i.e. construction meetings, actual construction, safety programs), observes/inspects construction to ensure compliance with the contract documents by contractors, acts as a conduit for owner-architect-contractor communications, assists the architect in evaluating claims made by contractor(s), and signs off on certificates of payment.

In the construction management delivery method, the school district owner chooses the construction team and has input into the selection of the construction project manager and the job superintendent. During construction, the ACM manages construction risk, but the school district owner still assumes the overall risk for the project. The ACM and architect each have a separate contract with the school district owner.

Source:

PUBLICATION	AUTHOR
USE OF ARCHITECTS AND/OR CONSTRUCTION MANAGERS IN SCHOOL CONSTRUCTION PROJECTS	STEPHEN M. KNUTSON, 1997

(c) Move Management

Carefully managing a move as your new/renovated facilities are being completed will help make the transition as smooth as possible. The complexities and complications of the move will positively or negatively affect the attitudes of staff and students towards the facilities. Move management issues to consider include the following:

- ♦ Moving into the Facility: allow ample time for the substantial completion of the new construction/addition/renovation before the move. Moving into a facility while contractors are still working, cleaning up, or moving out can be a frustrating experience for all parties. Warranty assessment can be complicated, as damage to the facility during moving activity is not covered under warranty by building contractors. Before moving, all spaces must be substantially completed, inspected, and certified by your contractor, architect, and/or the construction manager. Move into as complete a facility as possible!
- ♦ Moving Timelines: the move will take longer if moving into new facilities with all-new furnishings and equipment. Plan for moving existing equipment, and recognize that moving science, technology, and other specialized equipment will require special handling. School districts should allow four to six weeks to move into a small elementary school, and up to three to four months or longer to move into a large high school and be prepared for the school opening. This should allow for building and classroom equipment and systems to be tested, and reduce down time after classes begin. Under M.S. 120A.40 (b), school districts may begin the school year before September 1 to accommodate a school construction project exceeding \$400,000.
- ♦ Complete Landscaping: this might seem trivial in view of the entire building project, but nothing creates a bigger mess than tracking mud and dirt into a school because walks and landscaping are not completed. Allow two to three months for landscaping to "take hold" before introducing students and the public to the facility.
- ♦ Coordinating Move: make sure that final inspections are complete and final certificates of occupancy in place to avoid embarrassing situations for the school and the school district. Check with all local utility providers to make sure all services are connected to and operational in the new facility. Check the emergency back-up power system, if available.
- ♦ Commissioning Facility: all new school facilities must be commissioned [see Part 1.04 (e)]. Complete this process of verifying the functionality of all building systems when the systems are installed, but before the building is occupied. Ask your architect or engineer for assistance with this process. This process should also include training your facilities and maintenance staff to help them thoroughly understand how to operate and adjust building systems, thus reducing the chances of costly breakdowns and repairs.

Source:

MINNESOTA STATUTES	PARAGRAPH
120A.40	(b)

SECTION III. DESIGNING SCHOOL FACILITY SPACES

The purpose of Section III is to highlight important considerations in planning and designing school facilities, cite gross square footage, general space, and square footage guidelines, and identify the essential elements to consider in designing learning, school support, and community use/partnership spaces in elementary, middle level, and high schools. School districts and school facilities planning committees need to use this information to help understand the design parameters for school facilities that will be a part of a school facilities project proposal. Architects and other consultants working with school district staff must subsequently develop detailed specifications for each space.

Part 3.01 Planning for the Graduation Standards

In 1993, the Legislature enacted M.S. 120B.02, requiring the adoption of graduation rules. The result was the development of graduation standards, including basic skills and high standards requirements that students must meet in order to graduate from high school. To design school facilities that will assist in the implementation of the graduation standards, school district facilities planning committees need to consider the following issues:

1. Will schools need additional spaces for individual and small group work to help learn the basic skills? Different learning styles may require more spaces for additional work and assistance in learning basic skills.
2. Will schools need additional learning spaces for student demonstration and project preparation work that helps them work towards achieving high standards? Performance learning may require more spaces for student independent and group work.
3. Will classroom spaces need to be designed to reflect more student time spent on performance and demonstration activities and collaborative learning/small group project work, and less desk time?
4. Will the design and equipping of science labs and other spaces need to reflect learning activities emphasizing inquiry and work towards high standards?
5. Will classroom storage and student locker spaces need to be enlarged to accommodate the storage of demonstration and project materials? A demonstration project to present to the class will require more storage space than a textbook, and will likely not fit in a traditional student locker.
6. Will schools and classrooms need additional wiring and technology resources to accommodate student demonstration and project work and necessary record keeping?

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>120B.02</i>	
<i>MINNESOTA RULES, CHAPTER</i>	<i>PARTS</i>
<i>3501</i>	<i>.0010-.0290</i>
<i>3501</i>	<i>.0300-.0469</i>

Part 3.02 Planning for Technology

It is essential that school districts develop a technology plan to provide up-to-date technology for students, teachers, and community users, and to be in a strong position to receive technology-related grants and assistance from public and private sources. The Department of Children, Families & Learning provides a Technology Planning Guide, which identifies 16 key elements in technology planning, including the following:

- ◆ Overall Mission and Technology Vision Statement;
- ◆ Needs Assessment to Meet the Technology Vision Statement;
- ◆ Objectives for the Use of Technology to Address Unmet Needs;
- ◆ Technology Models;
- ◆ Technology Requirements;
- ◆ Technology Support Staff and Skills;
- ◆ Technology Operations Management Requirements; and
- ◆ Action Plan.

A technology plan is a key reference document in the planning of a school construction or renovation project. A comprehensive technology system provides a technology infrastructure that supports learning and instruction, and the generation of data and information. Infrastructure is the foundation for technology, and includes adequate power, circuits and switching, pathways, lighting, and heating, ventilation, and air conditioning. Planning for a technology infrastructure focuses on the infusion of technology across the curriculum as part of the planning process, rather than as an add-on computer lab or program.

Space design considerations are critical. Technology requires additional and carefully designed spaces. This includes infrastructure, classrooms, computer labs, media centers, and partnership and support spaces. ADA, building code, and special sound proofing and energy code requirements must be met. Develop an inventory of existing school technology to identify unmet needs, including, hardware, instruments and equipment, networking, voice communications, and related program and support spaces. Consider hiring a technology consultant or an architect specializing in technology systems and requirements early in the planning.

Schools in Minnesota increasingly have one or more computer labs and classrooms with computers and large screen monitors or overhead projectors. Schools should be wired for voice, data, video, and have network links into the Internet. Students should have access to technology in community facilities, as this will provide additional resources, expertise and technology experiences relevant for student work on graduation standards and lifework development issues. Students benefit from exposure to and experiences using technology resources in a variety of school, work, and exploratory settings.

Media centers and adjacent computer labs are often a central focus for technology. In the elementary school, trained teachers or technicians may staff computer labs to teach students basic computer and research skills. Middle or high schools with a house or wing design often have computers in common resource areas serving a cluster of classrooms. Computer labs may also serve specific curriculum areas such as business/office education or math/science. Spaces and support resources to provide technology education in a variety of settings need to be a part of any school construction or renovation project.

Source:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>TECHNOLOGY PLANNING GUIDE</i>	<i>MINNESOTA DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1997</i>

Part 3.03 Flexible Design and Multipurpose Use of Spaces

Specifications for school facilities spaces will continually be changing due to changes in law, revisions of building codes and health and safety regulations, new directions in learning, teaching, and technology, and changing school community needs. It is therefore important to consider flexible design and the multipurpose use of spaces in designing educational spaces. The key to flexibility is to create adaptable, expandable, and multipurpose spaces that can adapt to a variety of learning environments and programs at all school levels. Design ideas that support flexible spaces include the following:

- a school site that meets or exceeds acreage guidelines and allows room for expansion;
- a support infrastructure (e.g. mechanical, ventilation, lighting, technology) that will best respond to changing use of spaces;
- core spaces (e.g. cafeteria, gymnasium, media center) that are "over built" to allow for increasing enrollments;
- portable tables, chairs, furnishings, and equipment;
- classrooms with folding walls permitting different grouping options;
- studios/labs permitting use for consumer family life science, science, and art activities;
- common resource and support spaces outside groups of classrooms that include large group, team learning, and small group and individual student work spaces;
- library/media/technology centers for school and community use;
- a multipurpose cafeteria/commons for dining and school/community meetings and events; and
- an auditorium for music, theater, presentations, meetings, and community events.

Part 3.04 Gross Square Footage and General Space Guidelines for Elementary, Middle Level, and High Schools

This part provides an overview of the gross square footage guidelines for elementary, middle level, and high schools of different student enrollments, and general space guidelines that apply to all school construction projects.

A frequent question is: "how many square feet do we need for an elementary/middle level/high school?" **Adequate square footage, flexible and adaptable school spaces, and spaces for program expansion are the keys to the long-term and cost efficient use of school facilities.** Without adequate school sites and school facilities square footage, space renovations and expansions are costly and perhaps impossible to make. Space inadequacies will continue and probably compound over time, and it will be difficult to meet student needs as desired or required. Too often, in an effort to reduce school facilities project costs, school districts reduce school learning and support space square footages and do not approve adequate storage and program expansion spaces. In reality, this approach will cost a school district and local taxpayers more money in the long run because ongoing maintenance costs will be greater in school facilities under stress, and any renovations or additions can only be more costly than if completed as originally planned.

Within two years of project completion, many new or renovated schools report shortages of storage, support, and expandable learning and community use/partnership program spaces. **The 1999 Guide strongly encourages school districts to make adequate site size, space square footages, flexible/adaptable spaces, and spaces for program expansion a high priority, even if it means completing the project or fully equipping facilities at a later date.**

The following table provides guidelines for determining gross square footages per student for elementary, middle level, and high schools. **Middle level refers to middle, intermediate, or junior high schools containing students in grades 5-9 in various combinations.** Schools with other grade combinations (e.g. K-2, K-8, and K-12) need to consult with their architect to determine the appropriate gross square footages for their school.

These guidelines apply to new school construction projects. When it is economically and educationally advisable to renovate older school facilities, it is desirable to meet these guidelines whenever possible.

TABLE III
GROSS SQUARE FOOTAGE
PER STUDENT GUIDELINES

SCHOOL	ELEMENTARY	MIDDLE LEVEL	HIGH SCHOOL
STUDENT ENROLLMENT	SF	SF	SF
LESS THAN 500	125 - 155	170 - 200	200 - 225
500 - 999	110 - 135	160 - 190	190 - 220
1000-1500	100 - 135	150 - 180	180 - 200
1500-2000		140 - 170	170 - 190
2000 PLUS			150 - 180
FOR POOL ADD	10 - 12	10 - 12	10 - 12
FOR AUDITORIUM ADD	10 - 12	10 - 12	10 - 12
FOR COMMUNITY USE/PARTNERSHIP SPACES ADD...			

Utilize these square footage guidelines as a beginning point for determining the precise square footage needs of a proposed school through a thorough analysis of all space needs. If a proposed school is on the high or low end of the gross square footage range, school district facilities planning committees should understand the reasons why, and the benefits or consequences for students, staff, and community users if square footage is less or greater than the guidelines.

Facilities planning committees should not forget to include necessary school support space square footage as specified in Part 3.08.

The 1999 Guide features wider ranges of square footages for elementary, middle level, and high school learning, support, and community use/partnership spaces. It also features more options in space designs, reflecting the greater diversity in the programs and services schools provide, and discusses alternative means of delivering technology and other educational and community services. The addition of the middle level reflects the need to specify the space needs of middle level learners and programs. More community use/partnership space descriptions have also been added, reflecting increasing demand for school-community spaces in schools.

Because there are many possible grade configurations for elementary, middle level, and high schools, school districts must carefully select space square footages and space designs that best match the needs of the students and programs.

General school construction project space guidelines and assumptions include:

- general classrooms accommodate 15-30 students, depending upon the grade level, and whether the space is a general or specialized classroom or lab. Schools with consistently larger or smaller class sizes or with more than several student computer stations inside classrooms need to plan larger classrooms or smaller class sizes accordingly;
- meeting all building and health and safety codes;
- providing accessibility to all educational programs and services for students and adults with disabilities;
- designing flexible, expandable, and multipurpose spaces;

- specialized classrooms vary more in size due to varying numbers of students, program standards, and use of technology;
- larger enrollment schools need a greater the number of specialized instructional and supportive spaces;
- elementary, middle, and high schools may be able to schedule general classrooms for up to 100% utilization;
- middle level and high school space guidelines are much more variable than elementary depending on the type of school (e.g. 5-8 middle school, six-year high school, or senior high), enrollment, and specialized programs which are a part of the curriculum;
- Parts 3.05-.09 lists and describes a variety of learning and support spaces that school districts are encouraged, but not always required, to include in projects; and
- Part 3.08 School Support Spaces contains "Rules of Thumb" formulas to identify the square footage needed for toilets, general storage, mechanical/ electrical, and air circulation and structure.

Part 3.05 Guidelines for Elementary School Learning Spaces

(a) Organization, Program, and Design Considerations for Elementary Schools

Planning and designing facilities for elementary school students in pre-school through grades four, five, or six is based in part on the graduation standards, including the basic standards and high standards, and local school district and school mission, goals, policies, learning program, and student and staff support service decisions. School organization, learning program, and support service designs help students learn basic skills, work towards graduation standards benchmarks, assist teachers in delivering curriculum, and provide students and staff support services as needed.

Elementary school learning program and support service designs range from those emphasizing traditional, self-contained classrooms with centralized support services, to those with flexible classrooms in multi-age or grade level inclusionary settings with decentralized support services. Elementary schools may cluster learning programs and support services in a variety of ways to enhance the learning program, including the following:

- pre-school, kindergarten, after-school, and parent/family or community education programs and support services, which may include such programs as ECFE, Headstart, School-Age Child Care, Parent Education, and School-Community Health Services;
- primary, intermediate, and upper elementary grades, in linear classrooms with enhanced technology;
- primary, intermediate, and upper elementary grades in non-linear house, wing, or pod classroom arrangements with adjacent computer, resource, and student and staff support service areas;
- specialized learning spaces, including instrumental and choral music, physical education, technology, science, art, world language, special education, English as a second language, and gifted-talented;
- library/media center, which may include a technology center with computer labs, student production center, staff planning areas, and public access areas;
- multipurpose rooms which may include the gymnasium, community locker rooms, cafeteria, auditorium, student commons, and other large group assembly spaces; and
- administrative and student/family support services, which may include guidance counseling, social/psychological services, student records and test data, occupational and physical therapy, speech, vision, and audiology services, services for students with disabilities, the school nurse, volunteer coordinator, outreach workers, parent room, conference rooms, and other intermittent staff and services.

Title II of the Americans with Disabilities Act and Section 504 of the Rehabilitation Act require school districts to make all educational programs and services accessible to students and adults with disabilities. Schools must make appropriate modifications of rules, policies, and practices, and provide accommodations to assure accessibility. If accessibility requires altering the fundamental nature of a program (e.g. a student in a wheel chair wanting to participate in wrestling), providing accessibility to that program may not be necessary. Consider providing an optional activity.

In any renovation/remodeling project, school districts must remove all accessibility barriers. In a new school construction project, all accessibility requirements must be met. This includes exterior traffic, doors, and outdoor recreation areas, interior circulation, building features, doors, toilets and locker rooms, cafeteria/ dining and assembly/meeting areas, and classrooms, labs, and other spaces. The Accessibility Survey Tool will assist school districts in reviewing existing school facilities and in planning for new schools, and Accessible Outdoor Recreation Areas will provide the latest guidelines for outdoor spaces. When designing facilities, it is important to involve individuals who understand applicable codes and the functional impact of code requirements on programs and facilities.

An elementary school facilities planning team (see Section II) needs to determine the needed learning and school support spaces, and develop design options which will enhance the learning program and the delivery of curriculum and school support services. Elementary school designs need to be flexible and allow for alternative classroom, small, or large group learning arrangements, and optional ways of providing students and staff support services. A well-designed elementary school should be able to meet current as well as projected learning program and support service needs.

Sources:

<i>FEDERAL LAW</i>	<i>TITLE/SECTION</i>
<i>AMERICANS WITH DISABILITIES ACT</i>	<i>TITLE II 1993</i>
<i>REHABILITATION ACT</i>	<i>SECTION 504 1973</i>
<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>ACCESSIBILITY SURVEY TOOL</i>	<i>MINNESOTA DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1999</i>
<i>ACCESSIBLE OUTDOOR RECREATION AREAS 1999</i>	<i>DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1999</i>

(b) Elementary School Learning Spaces Square Footage Guidelines

TABLE IV
SQUARE FOOTAGE GUIDELINES FOR ELEMENTARY SCHOOL LEARNING SPACES

ELEMENTARY SCHOOL	LEARNING SPACES	SF
	EARLY CHILDHOOD	1000 - 1400
	KINDERGARTEN	1200 - 1500
	CLASSROOMS	850 - 950
COMMON SPACES	LARGE GROUP	10 -12 SF / STUDENT
	TEAM LEARNING	1200 - 1800
	SMALL GROUP / CONFERENCE / OFFICE	150 - 200
LIBRARY / MEDIA CENTER	ENTRANCE, CIRCULATION, DISTRIBUTION	600
	SEATING, STACKS, COMPUTER ACCESS, REFERENCE	8 - 10% OF STUDENTS x 35 SF
	SMALL GROUP / CONFERENCE / OFFICE	150
	MULTIMEDIA EDITING	100
	CLASSROOM / STORY AREA	800
	WORKROOM / STORAGE	400 - 600
	PROFESSIONAL LIBRARY	200
TECHNOLOGY	COMPUTER LAB	1000 - 1200
	CONTROL AND HEAD ROOMS, CLOSETS	390 - 440
	COPY CENTER	500
SPECIAL EDUCATION	CLASSROOM (5 - 8 STUDENTS)	450
	CLASSROOM / LAB	900 - 1200
ART/SCIENCE	MULTIPURPOSE CLASSROOM / LAB	1000 - 1500
	KILN, GLAZING, CLAY, DAMP ROOM	250
	SCIENCE LAB PREPARATION	250
MUSIC	GENERAL MUSIC	1000 - 1500
	CHORAL	1200 - 1700
	INSTRUMENTAL	1500 - 2000
	INSTRUMENT STORAGE + CIRCULATION	600 - 800 (4 SF / INSTRUMENT)
	ENSEMBLE / KEYBOARDING / MUSIC LIBRARY	400 - 500
PHYSICAL EDUCATION / SPORTS	GYMNASIUM (TWO STATIONS)	5500 - 7000
	MULTIPURPOSE	1700
	ADAPTIVE PHYSICAL EDUCATION	500
	GENERAL STORAGE	300 / STATION
ELEMENTARY SCHOOL	STUDENT ENROLLMENT	SF / STUDENT
GROSS SQUARE FOOTAGE	LESS THAN 500	125 - 155
	500 - 999	110 - 135
	1000-1500	100 - 135
	FOR POOL ADD	10 - 12
	FOR AUDITORIUM ADD	10 - 12
	FOR COMMUNITY USE/PARTNERSHIP SPACES ADD...	

(c) Early Childhood

School districts often provide spaces for early childhood programs such as Early Childhood Family Education, Head Start, Learning Readiness, Family Literacy/Even Start, School Age Care, Child Care, and community preschools, frequently in elementary schools. Recent infant brain research impacts school facilities planning by increasing parental demand for infant development programs and early parent education. Families often prefer schools as a location for family resource centers and interagency services that better meet the needs of children and their families. Essential elements to consider for early childhood program spaces include:

square footage: 1000-1400 square feet, including bathroom(s) and clothing storage areas, for 15-25 students. Provide additional spaces for cribs, eating, auxiliary play or other non-play areas, and indoor and outdoor large-muscle activities. A room to accommodate 12 to 18 adults for parent education and support activities is especially important for programs that involve both parents and young children.

location: first floor, convenient to outdoor exit and play areas, and bus/parent drop-off and pick-up zones. Classrooms should contain or be readily accessible to space for clothing storage, age-appropriate bathroom(s), a hand washing area, and a drinking fountain. Consider clustering early childhood classrooms with common spaces for student activities, teacher planning, and parent volunteers. Providing conference rooms for consultants to work with individual children allows community services to follow the children rather than having to move children from place to place throughout the community.

learning activities: large group activity, parent-child interaction, dramatic play, block and construction, crafts and creative arts, cognitive and manipulative experiences, music, science, reading, and large muscle active play. Provide a separate, safe area for infant and toddler-specific interest areas. Consider sharing spaces for large muscle activities and workrooms among early childhood programs, and providing dedicated spaces for the safety of children of different ages, and to ease scheduling complications.

learning aids, equipment, technology: age-appropriate toys, portable tables and stackable chairs, portable equipment with wheels, adjustable shelving and bookcases, easels, counter work space, a sink with hot and cold running water, a carpeted storytelling/ reading area, an overhead projector and screen, ceiling or wall-hung video monitors, and the ability to easily darken the room. Provide adequate display/bulletin board, AC power, and voice, video, and computer connections. Plan work and play stations for students with disabilities.

storage, other needs: provide storage spaces for food preparation equipment and eating facilities, diapering, and supplies, toys and equipment, including large muscle equipment. Provide work space(s) for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine.

(d) Kindergarten

Essential elements to consider for kindergarten spaces include:

square footage: 1200-1500 square feet for 15-25 students. Determine appropriate classroom size by analyzing current and anticipated class sizes, staffing, needed technology equipment and spaces, and whether clothing storage, bathroom(s), and other support resource and spaces will be located within or outside the classroom.

location: first floor, convenient to outdoor exit and play areas, bus/parent drop-off and pick-up zones. Classrooms should contain or be readily accessible to space for clothing storage, age-appropriate bathroom(s), a hand washing area, and a drinking fountain. Consider clustering kindergarten classrooms with common areas for student activities, teacher planning, and parent volunteers. If only a single kindergarten classroom, consider clustering with other early childhood or primary classrooms.

learning activities: individual, small, and large group activities, story-telling and listening, reading, science and environmental education, arts, crafts, and music, and creative and active play. Provide spaces to display children's work.

learning aids, equipment, technology: portable tables and stackable chairs, portable equipment, adjustable shelving and bookcases, plentiful white/chalkboard, counter and project work spaces, a sink with hot and cold running water, a carpeted storytelling/reading area, an overhead projector and screen, ceiling or wall-hung video monitors, and the ability to easily darken the room. Provide adequate display/bulletin board, AC power, and voice, video, and computer connections with Internet access, required spaces for cable trays, wiring, and conduits, and adjustable computer furniture. Plan work stations for students with disabilities.

storage, other needs: provide ample, flexible, and portable storage spaces for student and teacher work, equipment, and supplies. Provide work space(s) for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine.

Non-load bearing walls between classrooms will best maintain flexibility in classroom design. Utilize a combination of hard surface, resilient flooring and carpet for wet vs. dry and active vs. quiet areas. Pay careful attention to classroom acoustics. Natural light and quality light fixtures are highly desirable, and heating, ventilation, and air-conditioning and humidity control systems that produce good indoor air quality will improve the classroom environment, reduce absenteeism, and help student performance.

(e) Classrooms

Guidelines for classrooms apply to all non-specialized classrooms. These guidelines are meant to encourage the design of imaginative, flexible, accessible classrooms, or classrooms with adjacent common resource and support spaces, and to help avoid sterile, cramped classrooms lacking spaces for a variety of learning activities and storage. Essential elements to consider for elementary school classrooms include:

square footage: 850-950 square feet for 15-25 students. Determine appropriate classroom square footage by analyzing current and anticipated class sizes, staffing, needed space for technology and students with disabilities, and deciding whether common spaces (i.e. large group, team learning, small group, conference, and office spaces) will be located within or outside classrooms.

location: first floor for primary classrooms, with ready access to clothing storage, bathrooms, playground, and exit. Consider clustering classrooms by grade(s) and providing adjacent common spaces for large group, team learning, and small group activities.

learning activities: individual, small group, and classroom activities, including reading, language arts, and social studies, science and environmental education, art and music, and creative activities. Provide spaces to display students' work. Consider providing additional space for individual student assistance/conferencing if space is not readily accessible, and for additional technology stations as a greater number of curriculum and learning activities using technology are developed by teachers. Separate specialized classroom spaces for music, art and science activities are advantageous, especially for upper elementary school students.

learning aids, equipment, technology: portable tables or desks with stackable chairs, adjustable shelving and bookcases, counter and project work spaces, plentiful white/chalkboard, display/bulletin board, a sink with hot and cold running water, audio visual and other portable equipment, ceiling or wall-hung video monitors, and the ability to easily darken the room. Provide voice, video, and networked computer connections with Internet access, required spaces for cable trays, wiring, and conduits, and adjustable computer furniture to enable students to use technology to aid learning. Consider equipping classrooms with excess power and communications systems for future needs. Plan work stations for students with disabilities.

storage, other needs: provide ample, flexible, accessible, and portable storage spaces for student and teacher work, equipment, and supplies. These spaces should increase in size and number with the students' age. Provide work space(s) for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine.

Utilize student-centered scale, textures, colors, and forms appropriate for the age group. Non-load bearing walls between classrooms will best maintain flexibility in classroom design, and facilitate team teaching and multiple-class learning activities. Treat or reinforce wall board that is used in classrooms or student traffic areas to prevent student damage. It is advisable to use a combination of hard surface, resilient flooring and carpet for wet vs. dry and active vs. quiet areas. Classroom acoustics need careful attention. Natural light and quality light fixtures are highly desirable, and heating, ventilation, and air-conditioning and humidity control systems that produce good indoor air quality will improve the classroom environment, reduce absenteeism, and help student performance. Minimize the number of interior classrooms with no natural light. Consider air-conditioning enough classrooms for summer use by students and adults, if the entire building is not air-conditioned.

(f) Large Group/Team Learning/Small Group Conference

These common resource and support spaces permit teachers to use a wider variety of instructional styles in working with students with different learning styles. Essential elements to consider for elementary school large group, team learning, and small group conference spaces include:

square footage: 10-12 square feet per student in a large group space, 1200-1800 square feet for 125-175 students in a team learning space, and 150-200 square feet for students, staff, and parents in each small group, conference, or office space. If classroom technology space is limited, consider providing space for technology learning stations in common spaces, which may require additional square footage.

location: first floor for primary classrooms, adjacent to a cluster of classrooms with ready access to clothing storage, bathrooms, playground, and exit. Spaces for large group, team learning, and small group activities may overlap. Planning common spaces should provide for ease of supervision by teachers.

learning activities: large group presentations, team learning, and small group activities, including reading, discussion, project work, use of technology, tutorial assistance, and hands-on work in various areas of study.

learning aids, equipment, technology: stackable chairs for large group presentations, portable tables for team, small group, and conference room activities, shelving, counter and project work spaces, ceiling or wall-hung video monitors, white/chalkboard, display/bulletin board, a sink with hot and cold running water, audio visual and other portable equipment, and the ability to easily darken the large group space to use for audio visual presentations. Provide connections for technology work stations along walls, and adjustable computer furniture. These spaces should be made as flexible as possible. Plan work stations for students with disabilities.

storage, other needs: provide ample, flexible, accessible, and portable storage spaces for student and teacher work, equipment, and supplies. These spaces should increase in size and number with the students' age. Provide work or office space for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine.

(g) Library/Media Center

Library/media center additions to elementary schools are very common because of the need for larger library/media centers that can accommodate new technologies and increasing numbers of student and community users. School districts may want to consider "over-building" the library/media center to better accommodate rapidly changing information technologies and increasing users. Essential elements to consider in an elementary school library/media center include:

square footage: 600 square feet for entrance, circulation, and distribution, and 35 square feet times 8-10% of the student enrollment capacity for seating, stack, computer use with Internet access, and reading and reference work spaces (e.g. 1750 square feet for 50 students). Provide additional spaces for small group/conference rooms (150 square feet), multimedia editing space (100 square feet), a library classroom (800 square feet), workroom/storage space (400-600 square feet), and a professional library (200 square feet) either in or adjacent to the library/media center. See Part 3.05 (h) for computer lab space requirements. Utilize portable room dividers to separate areas if desired (e.g. primary reading area).

location: first floor for primary classroom use, and near an entrance for delivery of equipment and materials and community user access. All student areas in the library/media center should be visible from the circulation desk area, and adjacent rooms need glass partitions for ease of supervision purposes. The backs of computers need to be accessible for maintenance purposes. Whereas natural light is desirable, the location of computers and shelving must not cause computer screen glare and book binding deterioration problems. The library/media center or adjacent spaces thereto may contain a computer lab, multimedia editing, a classroom, conference rooms, a staff library or workroom, and community user spaces.

learning activities: activities which teach students information literacy and research skills include individual reading, browsing, study and research, computer and Internet use, and small and large group instruction. The elementary school library/media center is a child-friendly environment where students often come in whole class groups and engage in focused activities. Tailor learning activities to the wide range of elementary age groups. Providing staff development in the use of information technologies supports the curriculum and library/media center learning activities.

learning aids, equipment, technology: portable and adjustable shelving, chairs, cushions, tables and desks of different sizes, computers with Internet access, printers, VCR's and tapes, newspapers and magazines, maps, audio visual equipment, display cases and bulletin boards, and other furniture and equipment suitable to the wide range of elementary student age groups and interests. Provide some adult-sized furniture for staff and visitor use. Plan connectivity to school library/media center resources from classrooms, homes, other schools, and information centers (e.g. public library) to ensure all students equal and timely access to learning resources. Plan accessibility and work stations for students with disabilities.

storage, other needs: provide ample storage spaces for materials and equipment. Carts for hauling books and equipment are essential. Carpeting, acoustics, lighting, temperature and humidity control, and ventilation need careful consideration. Plan to electronically automate, secure, and back-up library/media center operations. The library/media center should be flexible in design to accommodate emerging technologies and changing user needs.

Sources:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>FACILITIES GUIDELINES FOR LIBRARY/MEDIA PROGRAMS</i>	<i>MARYLAND STATE DEPARTMENT OF EDUCATION, 1998</i>
<i>GUIDELINES FOR MINNESOTA SCHOOL MEDIA PROGRAMS</i>	<i>MINNESOTA EDUCATIONAL MEDIA ORGANIZATION, 1992</i>

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(h) Technology

Technology needs to be made available to students, staff, and community users in increasingly diverse forms and settings, including classrooms, library/media centers, offices and support spaces, as well as in computer labs. Each school district and school must design and deliver technology in the forms and settings that best meet the needs of students, staff, and community users.

Computer Labs

Essential elements to consider for elementary school computer labs include:

square footage: 1000-1200 square feet for 20-30 students, including a teacher demonstration area. Provide 390-440 square feet for control and head rooms, and a technology closet, and 500 square feet for a copy center.

location: first floor, near classrooms or a grade house, or the library/media center. Avoid light glare from windows that creates screen vision problems. Design the computer lab to fit the purpose(s) of the lab. The teacher should be able to view as many computer screens as possible. Secure the lab for after-hours use by students and community users, and locate it near a convenient entrance.

learning activities: acquiring computer literacy skills, and practicing keyboarding, Internet research, and other applications as appropriate. The primary purpose(s) of the lab will help determine the arrangement of spaces for individual student, small group, and teacher demonstration learning activities.

learning aids, equipment, technology: computer desks, chairs, tables, and equipment should be portable and adjustable to accommodate the varied age, heights, and physical development support needs of the students. Networking centers, wiring, and equipment must support the lab and its intended uses. Provide a LCD projector and a pull-down screen for teacher demonstrations, and ample chalk/white board and display/bulletin board. Plan computer work stations for students with disabilities.

storage, other needs: secure storage spaces for student work and teaching materials are necessary. Provide a security system to ensure the safety of computer equipment. The electrical and power setup for the network system and student work stations need careful planning. Lighting needs special attention to avoid screen glare and eye fatigue. Provide temperature, humidity control, and air conditioning to prevent computer lab overheating and for use during the summer. A static-free carpeting or floor covering is desirable.

(i) Special Education

Special education programs and services must provide for preschool and elementary school students with a wide range of disabilities, from mild to severe, and those with multiple disabilities. It is critically important to make a careful assessment of the projected number of special education students and the types of programs, staffing, and services needed. Next, determine program space needs and whether to locate resource and support spaces within or outside the classroom. Finally, design or modify spaces as appropriate (e.g. larger spaces are needed for students in wheelchairs, or with walkers). Advance planning will help schools avoid the cramming of special education students into storage, office, and other spaces not intended for instruction. All ADA and building code requirements for accommodating students with disabilities must be met. It is important to involve staff and architects with knowledge of programs and code (e.g. time-out room) requirements. Essential elements to consider for elementary school special education spaces include:

square footage: 450 square feet for 5-8 students in an individualized instruction setting, and 800-1200 square feet in a classroom/lab setting. Utilize portable dividers to help make all spaces as flexible as possible to allow for regular modifications. Computers and other accommodations for individual students may require additional square footage. Students with severe disabilities and/or personal hygiene needs need separate, self-contained rooms or spaces, and spaces for sinks, toilets, diapering, showering, changing, and laundry. Spaces for a time-out or quiet space room and physical therapy may be necessary. Providing a room for observation, student/staff/parent conferences, and small group work is highly recommended.

location: first floor, near playground and exit, clothing storage, food service, adaptive physical education, conference/testing, occupational/motor therapy, speech and music therapy rooms, and other related support service spaces. It may be appropriate to separate program and service areas for younger and older students.

learning activities: individual and computer-assisted instruction, arts and crafts, home living skills, science and environmental education, music, and activities tailored to the special learning needs of students.

learning aids, equipment, technology: learning aids, equipment, and technology that meets individual students needs (e.g. Braille machines, magnifiers), and special handrails, walks, ramps, and doors to assure student access to the building, classrooms, and all program and service spaces. Provide adjustable and portable tables, chairs, and desks, computer stations, ceiling or wall-hung video monitors, portable equipment, bookcases and adjustable shelving, counter and project work spaces, plentiful white/chalkboard, display/bulletin board, a sink with hot and cold running water, and audio visual equipment. Plan teacher work and demonstration spaces suitable for the program.

storage, other needs: provide ample, flexible, accessible, and portable storage spaces for student, teacher and teacher aide materials, supplies, and equipment. Storage spaces should increase in size and number with the students' age. Provide private work and office space for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine. The observation room needs to have a one-way mirror.

Provide student-centered scale, textures, colors, and forms appropriate for the age group. Utilize treated or reinforced wall board in classrooms or student traffic areas to prevent student damage. Provide many power outlets throughout the room, and consider capping the outlets. Utilize a combination of hard surface, resilient flooring and carpet for wet vs. dry and active vs. quiet areas. Classrooms should have rounded corners and be acoustically treated. Utilize natural gray colors, natural light, quality light fixtures (fluorescent lights cause problems for students with auditory and visual processing difficulties), and heating, ventilation, and air-conditioning and humidity control systems that produce good indoor air quality to improve the classroom environment, reduce absenteeism, and help student performance. Minimize the number of interior classrooms with no natural light. Air-condition enough classrooms for summer program use.

(j) Art/Science

It is desirable to have separate or combined art and science rooms for art and science learning activities that can not easily be provided in classrooms. Essential elements to consider for an elementary school art/science classroom include:

square footage: 1000-1500 square feet for 20-25 students in a multipurpose classroom/lab, including storage space for teacher and student materials. An additional 250 square feet may be necessary for teacher lab preparation space. Dividing a classroom/lab will facilitate students working on several art and/or science activities.

location: first floor, near an outside exit for access to an outdoor area for sketching and environmental education.

learning activities: individual and small groups of students working with a variety of art materials and media (e.g. finger paints, clay, water color), and working in hands-on science activities using concrete objects, observing, exploring, and problem solving. Provide separate work surfaces for dry and water-based art activities. Extensive lab and field related activities using the hands-on, inquiry approach to learning are necessary to help students understand science and become scientifically literate. Stress safety throughout all science lab activities.

learning aids, equipment, technology: adjustable and portable tables, work counters, and chairs for different age groups. Provide hard, mar-resistant table surfaces, clay bins, tool carts, work benches, potters wheels and a kiln, and a variety of learning materials, tools, and equipment for art activities. Science lab stations need electricity, heat, and water, as well as magnets, lenses, microscopes, plant growing lights, and other age-appropriate tools and equipment. Utilize wall and case spaces to display student art and science work. Provide adequate wiring for audiovisual equipment, ceiling or wall-hung monitors, and computers with Internet access. Appropriate sink units for art and science lab work are necessary, and adequate counter cleanup spaces are essential for fast cleanup. Plan work stations for students with disabilities.

storage, other needs: provide storage spaces, some secured, for student projects and materials, hazardous substances, tools, and equipment. Frequent air exchange and an outside exhaust system for art and science lab activities are important. Place the kiln in a separate, small room. Provide a central teacher work space, demonstration table, and ceiling mounted projection screen. Supply and maintain safety glasses, gloves, first aid supplies, fire extinguisher(s), and other safety tools and equipment. Review the checklists for science lab and chemical storage safety contained in the health and safety materials annually sent to school district superintendents. All state and federal safety codes and regulations must be met.

Source:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>CAPITAL EXPENDITURE: HEALTH AND SAFETY REVENUE APPLICATION</i>	<i>DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1999</i>

(k) Music

Cramped music spaces are often renovated and expanded because of higher than anticipated student enrollments, and the need for expanded spaces for rehearsal, practice, the circulation of large groups of students, and storage and offices. Essential elements to consider for elementary school music room spaces include:

square footage: 1000-1500 square feet for general music classes of 25-50 students, 1200-1700 square feet for choral groups of 35-80 students, and 1500-2000 square feet for instrumental classes of 30-65 students. Provide adjacent, but separate spaces for the storage of instruments, 600-800 square feet, and ensemble/keyboarding/music library, 400-500 square feet. Larger music programs require separate rooms for instrumental (band/orchestra), choral, and general music classes. In smaller programs, if the room is large enough and the schedule permits, one room may double as a general music room and a choral room. It is not desirable to have one room serve as an "all-purpose" general music, vocal, and instrumental room. Ceiling heights of at least 16 feet, preferably 18-20 feet are essential in a choral room, and 18 feet in an instrumental room to assure good acoustics and sufficient sound-pressure-level dissipation.

location: first floor, near a large group performance/assembly area. Situate the music rooms in an isolated area of the building, and utilize sound-insulating construction to prevent the disruption of learning activities in other areas. Double doors leading into the music rooms and the performance area are necessary for moving pianos and large percussion instruments and equipment. A drinking fountain and restrooms should be convenient to the music area.

learning activities: music is learning by listening and active participation, so spacious rooms with special care given to sound isolation and acoustic clarity provide the best quality music learning environments. Music spaces must accommodate a variety of learning experiences for individuals, small, and large groups of students. Listening, playing, singing, and expressing through both sound and physical movement are integral goals of all music programs. Students with disabilities are increasingly involved in music programs; plan for accessibility and work stations accordingly.

learning aids, equipment, technology: for general music and vocal programs, a stereo system with recording capabilities, piano, sheet music with storage cabinets, music textbooks, CD's and tapes, classroom instruments, white boards with one-half plain white and one-half with staff lines, bulletin boards, chairs or other seating, and choral risers are necessary. An overhead projector with pull-down screen, music stands, a VCR with monitor, film projector and wall maps, and computer work stations with electronic keyboards are also useful.

For instrumental programs, provide stereo recording and playback equipment, sheet music, music stands, music-posture chairs, a conductor's podium and stand, white boards with one-half plain and one-half with staff lines, district-purchased instruments, electronic tuner, portable chair risers, and if required, acoustic shells. An instrument repair bench with tools, and a large, deep sink for instrument cleaning and maintenance are also desirable.

storage, other needs: provide ample, specialized, and in some cases lockable storage spaces for a great variety of expensive musical instruments, ethnic instruments, equipment, risers, and learning materials including concert props, costumes, and bulletin board materials. These storage spaces should include shelving, cabinets, and instrument storage lockers. In general, separate, adjacent storage rooms are desirable for both choral and instrumental rooms to retain valuable floor space in the main room and to provide better security. Adjacent practice rooms need to have observation windows. The size, shape, ceiling height, acoustic treatment, heating, ventilation, humidity control, lighting, sound system, and other related requirements are most complex, and the involvement of staff and/or consultant assistance in detailing specifications is recommended. The reference materials listed below can provide valuable information for the planning team.

Sources:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>ELEMENTARY MUSIC PLANNING GUIDE</i>	<i>WENGER CORPORATION, 1994 1-800-733-0393</i>
<i>THE SCHOOL MUSIC PROGRAM: DESCRIPTION AND STANDARDS</i>	<i>MENC, 1986 703-860-4000</i>

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(I) Physical Education/Sports

Additions to physical education and sports activity spaces are very common because of crowded and insufficient spaces to accommodate increasing numbers of student and community users. Increasing demands on indoor and outdoor physical education and sports activity spaces come from legal requirements to provide gender equality and full access for students with disabilities in all programs, services, and facilities, and changes in programs emphasizing more personal fitness and non-traditional individual, dual, and team sports and activities. Planning for physical education and sports activity spaces must consider future program uses as well as student enrollment and community user trends; if one or more are positive, consider "over-building" to provide adequate spaces over the longer term at a cost savings. Essential elements to consider for elementary school physical education and sports activity spaces include:

square footage: 5500-7000 square feet for 30-60 pupils in a two teaching station gymnasium (one elementary school teaching station equals 3500 square feet). The two teaching station gymnasium ceiling height should be at least 25 feet. Provide at least 1700 square feet and an 18 foot ceiling for a small multipurpose room suitable, for example, for pre-school or kindergarten student games. A 500 square feet room is necessary for adaptive physical education activities. Providing space for storage of equipment, 300 square feet for each teaching station, is essential. If planning community or middle/high school after-school sports activities use of the gymnasium, locker rooms may also be necessary. In a larger gymnasium, it may be desirable to separate the teaching stations with a folding partition or curtain.

If there is only one gymnasium in the elementary school, it should not be a multipurpose gymnasium/cafeteria because of the difficulty of scheduling physical education classes around lunch periods. If planning a multipurpose gymnasium/cafeteria for a third physical education teaching station, special requirements need to be met. Portable or permanent stages for gymnasium assembly purposes require additional space for curtains, backdrops, exits, sound and lighting control, and storage space.

To provide for outdoor elementary physical education and sports activities, **a minimum of 5+ acres should be set aside for outdoor physical education and sports activities.**

TABLE V
ELEMENTARY SCHOOL OUTDOOR ACTIVITY SPACES

AREA/ACTIVITY	RECOMMENDED DIMENSIONS (IN FEET)	SPACE REQUIRED SQUARE FEET	NUMBER REQUIRED	TOTAL REQUIRED SQUARE FEET	ACRES
APPARATUS	75 x 120	9,000	1	9,000	0.21
MULTIPURPOSE	100 x 120	12,000	2	24,000	0.55
TRACK AND FIELD	80 x 120	9,600	1	9,600	0.22
GENERAL PURPOSE	100 x 200	20,000	1	20,000	0.46
SOFTBALL	250 x 250	62,500	2	125,000	2.87
FIELD GAMES	180 x 140	25,200	2	50,400	1.16
			TOTAL	229,000	5.26

Smaller enrollment schools may need somewhat less space, larger enrollment schools more space. Plan for additional acreage for larger or additional fields and parking spaces if middle/high school or community use of outdoor activity areas is envisioned. See Part 3.06 (m) or 3.07 (n) for the dimensions of other fields and specialized areas (e.g. tennis courts).

location: next to the music rooms if for performance or assembly programs, and close to parking for easy access by students and community users. Indoor and outdoor physical education, play, and sports activity areas need to be easily accessible, yet distant enough from classrooms and outside classroom walls to minimize disrupting classroom learning activities. Locate the playground apparatus area in a shady spot, and separate apparatus for pre-school and primary students from that for older elementary school students. Provide ample space around the various play apparatus, and make safety a primary concern for locating and spacing apparatus. Avoid building a gymnasium in soil with a high water table or water runoff areas to limit construction and floor expansion and maintenance difficulties. Plan accessibility for students with disabilities.

If a multipurpose gymnasium, provide doors or partitions to separate the kitchen and preparation areas from the activity area. Plan to avoid the delivery of food supplies through the gymnasium.

learning activities: provide spaces for a great variety of individual, small, and large group physical education and sports activities for various age groups. Indoor activities include learning fundamental movement patterns, rhythmic or dance, exercise conditioning, gymnastics, basketball, volleyball, badminton, floor hockey, aquatics, and games and sports for individuals and teams. Outdoor activities include free play, field games such as track and field, softball, soccer, football, and hard-surface circle games, hopscotch basketball, tetherball, and tennis. Plan learning activities for students with disabilities.

learning aids, equipment, technology: ropes, mats, balls, bats, rings, bars, baskets and backboards, wall markings, musical equipment, and many other supply and equipment items are necessary for indoor and outdoor activities. Provide sandboxes, playground apparatus, backstops, a multipurpose, hard-surfaced area for all-weather use, and field areas for outdoor field games and individual and team activities. Cushioning materials around playground apparatus and on gymnasium walls are essential for safety purposes. Provide a public address system with related audio equipment in the gymnasium for both instructional purposes and school events and performances. Modify equipment items for students with disabilities as appropriate.

The publication Accessible Outdoor Recreation Areas contains design guidelines for routes of travel, surfacing materials, play field access, and equipment. School districts and architects must carefully follow these and other appropriate guidelines and meet all building and health and life safety codes.

storage, other needs: provide storage spaces for indoor and outdoor equipment and supplies and large doors for easy access to and movement of equipment. The storage of audio equipment within the gymnasium is desirable. Portable means of hauling and securing equipment are also necessary. Provide portable folding or stackable tables and chairs for use in multipurpose gymnasiums, and storage spaces for the same.

Plan carefully to meet all floor, ceiling, wall, windows, heating and ventilation, acoustics and sound insulation, electrical, and lighting requirements. Easy access to first aid supplies or help is important. Inside and outside drinking fountains are essential. Provide air conditioning and bleachers for summer and/or sports or community event use.

Sources:

<i>PUBLICATION</i>	<i>AVAILABLE FROM</i>
<i>FACILITY PLANNING FOR PHYSICAL EDUCATION, RECREATION, AND ATHLETICS</i>	<i>AMERICAN ALLIANCE FOR HEALTH, PHYSICAL EDUCATION, RECREATION AND DANCE, 1993</i>
<i>BEYOND THE FIELD HOUSE</i>	<i>SCHOOL PLANNING & MANAGEMENT, SEPTEMBER, 1996</i>
<i>ACCESSIBLE OUTDOOR RECREATION AREAS MANUAL 1997/1998</i>	<i>DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1998</i>

Part 3.06 Guidelines for Middle Level School Learning Spaces

(a) Organization, Program, and Design Considerations for Middle Level Schools

Planning and designing facilities for middle level students is based in part on the graduation standards, including the basic skills standards and high standards, and local school district and school mission, goals, policies, learning program, and student and staff support service decisions. School organization, learning program, and support service designs help students learn basic skills, work towards graduation standards benchmarks, assist teachers in delivering curriculum, and provide students and staff support services as needed.

The diversity and complexity of school organization and programs (curriculum, services) increases from the elementary to the middle level due to a number of factors, which may include the following:

- a shift in emphasis on learning basic skills to exploring a greater variety of subjects;
- larger student enrollments and more classes and teachers per student;
- the need to provide more specialized programs and staff to meet student interests and provide instruction at higher skill levels;
- mainstreaming students with disabilities in a wider variety of classroom and lab settings;
- the need to provide more coaching and teaching of students in a great variety of extracurricular programs at higher skill levels;
- the greater impact of change on the greater variety of programs and spaces in a middle level school; and
- increasing community use of middle level school facilities.

A middle level school must be flexible and adaptable in order to regularly change programs and use spaces for other purposes. Middle level school organizational designs may encompass any or all of the following concepts: self-contained or shared classrooms, large and small group, team learning, individual study and/or resource areas, and other specialized spaces. School facility planning should support the current best thinking in middle level education such as more interdisciplinary teaching and the need for a greater variety of learning experiences for students. Middle level schools may cluster learning programs and support services in a variety of ways to enhance the learning program, including the following:

- middle level grades in linear academic classrooms with enhanced technology;
- middle level grades in non-linear houses, wings, or pods with a core or block subject classroom arrangement with adjacent resource and support service spaces;
- library/media center/technology center with central resource center, computer labs, video production or telecast, technology control centers, and public access area;
- performing arts area including music, art, drama/theater, and an auditorium or performance space;
- lifework development area, including technical and family and consumer science education;
- physical education, athletic, and community recreation area including gymnasium(s) and locker rooms, health classrooms, and other indoor and outdoor physical education, adaptive physical education, athletic, and community recreation spaces;
- special and support services including English as a second language, reading, students with disabilities, and gifted-talented;
- cafeteria/commons, including food service, student commons, study hall, performance space, and student activity and community meeting rooms;
- administration and student/family support services including guidance counseling, social/psychological services, student records and test data, health, speech, vision, audiology services, conference rooms, and other intermittent staff and services; and
- community education offices, rooms, and other community use/partnership spaces.

Title II of the Americans with Disabilities Act and Section 504 of the Rehabilitation Act require school districts to make all educational programs and services accessible to students and adults with disabilities. Schools must make appropriate modifications of rules, policies, and practices, and provide accommodations to assure accessibility. If accessibility requires altering the fundamental nature of a program (e.g. a student in a wheel chair wanting to participate in wrestling), providing accessibility to that program may not be necessary. Consider providing an optional activity.

In any renovation/remodeling project, school districts must remove all accessibility barriers. In a new school construction project, all accessibility requirements must be met. This includes exterior traffic, doors, and outdoor recreation areas, interior circulation, building features, doors, toilets and locker rooms, cafeteria/ dining and assembly/meeting areas, and classrooms, labs, and other spaces. The Accessibility Survey Tool will assist school districts in reviewing existing school facilities and in planning for new schools, and Accessible Outdoor Recreation Areas will provide the latest guidelines for outdoor spaces. When designing facilities, it is important to involve individuals who understand applicable codes and the functional impact of code requirements on programs and facilities.

A middle level school facilities planning team (see Section II) needs to determine the needed learning and school support spaces, and develop design options which will enhance the learning program and the delivery of curriculum and school support services. Middle level school designs need to be flexible and allow for alternative classroom, small, or large group learning arrangements, and optional ways of providing students and staff support services. A well-designed middle level school needs to be able to meet current as well as projected learning program and support service needs.

Sources:

<i>FEDERAL LAW</i>	<i>TITLE/SECTION</i>
<i>AMERICANS WITH DISABILITIES ACT</i>	<i>TITLE II 1993</i>
<i>REHABILITATION ACT</i>	<i>SECTION 504 1973</i>
<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>ACCESSIBILITY SURVEY TOOL</i>	<i>MINNESOTA DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1999</i>
<i>ACCESSIBLE OUTDOOR RECREATION AREAS 1999</i>	<i>DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1999</i>

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(b) Middle Level School Learning Spaces Square Footage Guidelines

TABLE VI
SQUARE FOOTAGE GUIDELINES FOR MIDDLE LEVEL SCHOOLS

MIDDLE LEVEL	LEARNING SPACES	SF
COMMON SPACES	CLASSROOMS	850 - 950
	LARGE GROUP	15 SF / STUDENT
	TEAM LEARNING AREAS	1500 - 2000
	SMALL GROUP / CONFERENCE / OFFICE	150 - 200
LIBRARY / MEDIA CENTER	ENTRANCE, CIRCULATION, DISTRIBUTION	600 - 800
	SEATING, STACKS, COMPUTER ACCESS, REFERENCE	8 - 10% OF STUDENTS x 35 SF
	SMALL GROUP / CONFERENCE / OFFICE	150
	MULTIMEDIA EDITING	200
	CLASSROOM	800
	WORKROOM / STORAGE	400 - 600
	PROFESSIONAL LIBRARY	200
TECHNOLOGY	COMPUTER LAB	1000 - 1300
	CONTROL AND HEAD ROOMS, CLOSETS	540 - 640
	COPY CENTER	500 - 800
SCIENCE	CLASSROOM / LAB	1000 - 1200
	STORAGE / LAB PREP	300
SPECIAL EDUCATION	CLASSROOM (5 - 8 STUDENTS)	450
	CLASSROOM / LAB	800 - 1200
TECHNICAL EDUCATION	TECH LAB	1800 - 2400
	GENERAL SHOP	2000 - 3000
	CADD / GRAPHICS	1400 - 1800
	PRINCIPALS OF TECHNOLOGY	1200 - 1400
FAMILY AND CONSUMER SCIENCE	CLASSROOM	900 - 1000
	CLASSROOM / LAB	1200 - 1500
ART	MULTIPURPOSE	1200 - 1500
	DRAWING AND PAINTING	1200 - 1500
	CERAMICS	1500
	KILN, GLAZING, CLAY, DAMP ROOM	400
	STORAGE	300 / AREA
	PHOTOGRAPHY	1000
	DARKROOM	400 - 800
	OFFICE	120

MIDDLE LEVEL	LEARNING SPACES	SF
MUSIC	INSTRUMENTAL	1500 - 2700
	CHORAL	1200 - 2000
	GENERAL MUSIC	1000 - 1200
	INSTRUMENT STORAGE	600 - 800 (4 SF / INSTRUMENT)
	SMALL PRACTICE	40 - 60
	GROUP PRACTICE	75 - 100
	ELECTRONIC KEYBOARDING LAB	500 - 750
	MUSIC LIBRARY	150 - 200
	OFFICE / LESSON STUDIO	100 - 200
	INSTRUMENT REPAIR	50 - 75
	PERFORMANCE EQUIPMENT STORAGE	200 - 300
PHYSICAL EDUCATION / ATHLETICS	GYMNASIUM (TWO STATIONS)	10000 - 12000
	MULTIPURPOSE	1700
	WEIGHTS / FITNESS	1500
	ADAPTIVE PHYSICAL EDUCATION	500
	PHYSICAL EDUCATION LOCKER ROOMS	1 SF / STUDENT CAPACITY
	ATHLETIC LOCKER ROOMS	1000 - 1500
	GENERAL STORAGE	300 / STATION
	ATHLETIC STORAGE	600 - 800
	SPECTATOR SEATING	8 SF / PERSON OPEN BLEACHERS 4' DEEP TO CLOSE BLEACHERS
	POOL	10000 - 12000
	DIVING WELL	1500 - 2500
MIDDLE LEVEL	STUDENT ENROLLMENT	SF
GROSS SQUARE FOOTAGE	LESS THAN 500	170 - 200
	500 - 999	160 - 190
	1000-1500	150 - 180
	1500-2000	140 - 170
	FOR POOL ADD	10 - 12
	FOR AUDITORIUM ADD	10 - 12
	FOR COMMUNITY USE/PARTNERSHIP SPACES ADD...	

(c) Classrooms

Guidelines for classrooms apply to all non-specialized classrooms. These guidelines are meant to encourage the design of imaginative, flexible, accessible classrooms, or classrooms with adjacent common resource and support spaces, and to help avoid sterile, cramped classrooms lacking spaces for a variety of learning activities and storage. Essential elements to consider for middle level school classrooms include:

square footage: 850-950 square feet for 20-28 students. Determine appropriate classroom square footage by analyzing current and anticipated class sizes, staffing, needed space for technology and students with disabilities, and deciding whether common spaces (i.e. large group, team learning, small group, conference, and office spaces) will be located within or outside classrooms. If resource and support spaces and/or more than several computers are to be placed in the classroom, additional square footage is necessary. Consider providing additional space for technology for more advanced student project work and teacher applications of technology to the curriculum.

location: in quiet areas, near the library/media center. Consider clustering classrooms by grade-level houses and providing adjacent common spaces for large group, team learning, small group, and individual student work on special projects or computers, as well as teacher team planning space.

learning activities: individual, small, team, and large group activities in core academic subjects and elective classes, including computer applications. Provide spaces to display students' work. Students working on graduation standards benchmarks may need additional space for small group and individual student project and demonstration learning activities. Consider providing space for additional technology stations as a greater number of curriculum and learning activities using technology are developed by teachers.

learning aids, equipment, technology: portable tables or desks and stackable chairs, adjustable shelving and bookcases, white/chalkboard, display/bulletin board, audio visual and other portable equipment, ceiling or wall-hung video monitors, and an overhead projector and screen. Provide voice, video, and networked computer connections with Internet access, required spaces for cable trays, wiring, and conduits, and adjustable computer furniture to enable students to use technology to aid learning. Consider equipping classrooms with excess power and communications systems for future needs. Plan work stations for students with disabilities.

Plan teacher work, demonstration, and equipment spaces to fit the curriculum. This would include providing audio recording equipment in English, graph chalkboard in math, maps and specialized reference materials in social studies, an elevated presentation stage in speech, and reading or language lab stations in reading or world languages.

storage, other needs: provide ample, flexible, accessible, and portable storage spaces for student projects and teacher materials, equipment, and supplies. Provide shared work or office spaces for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine.

Utilize non-load bearing walls between classrooms to best maintain flexibility in classroom design and facilitate team teaching and multiple-class learning activities. Treat or reinforce wall board that is used in classrooms or student traffic areas to prevent student damage. Classroom acoustics need careful attention. Natural light and quality light fixtures are highly desirable, and heating, ventilation, and air-conditioning and humidity control systems that produce good indoor air quality will improve the classroom environment, reduce absenteeism, and help student performance. Minimize the number of interior classrooms with no natural light. Consider air-conditioning the entire building or at least enough classrooms for summer use by students and adults.

(d) Large Group/Team Learning/Small Group Conference

These common resource and support spaces permit teachers to use a wider variety of instructional styles in working with students with different learning styles. Essential elements to consider for middle level school large group, team learning, and small group conference spaces include:

square footage: 15 square feet per student in a large group space, 1500-2000 square feet for 125-175 students in a team learning space, and 150-200 square feet for each small group, conference, or office space. If classroom technology space is limited, consider providing space for technology learning stations in common spaces, which may require additional square footage.

location: adjacent to a cluster of academic classrooms. Spaces for large group, team learning, and small group activities may overlap. Planning common spaces should provide for ease of supervision by teachers.

learning activities: large group presentations, team learning, small group discussion and activities, student project work, tutorial assistance in basic skills, and computer work.

learning, aids, equipment, technology: stackable chairs for large group presentations, portable tables for team and small group activities, counter and project work spaces, ceiling or wall-hung video monitors, audio visual and other portable equipment, and the ability to easily darken the large group space to use for audio visual presentations. Provide other equipment appropriate for the classes using common spaces (e.g. reading or language lab stations, sinks for art or science work). Provide connections for technology work stations along walls, and adjustable computer furniture. Plan work stations for students with disabilities.

storage, other needs: provide ample, flexible, accessible, and portable storage spaces for student and teacher work, equipment, and supplies. Graduation standards work may require additional storage spaces for student project work. Provide work or office space for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine.

(e) Library/Media Center

Library/media center additions to middle level schools are very common because of the need for library/media center spaces that can accommodate new technologies and increasing numbers of student and community users. School districts may want to consider "over-building" the library/media center to better accommodate rapidly changing information technologies and increasing users. Essential elements to consider for a middle level school library/media center include:

square footage: 600-800 square feet for entrance, circulation, and distribution, and 35 square feet times 8-10% of the student enrollment capacity for seating, stacks, computer use with Internet access, and reading and reference work spaces (e.g. 1750 square feet for 50 students). Provide additional spaces for small group/conference rooms (150 square feet), multimedia editing (200 square feet), a library classroom (800 square feet), workroom/storage space (400-600 square feet), and a professional library (200 square feet) either in or adjacent to the library/media center. See Part 3.06 (f) for computer and other technology space requirements.

location: near academic classrooms on the first floor, and near an entrance convenient for the delivery of equipment and materials and community user access. Plan carefully the design specifications and space allocations for activities such as study and research, informal reading, group instruction, production and group projects, and library administration. All student areas in the library/ media center need to be visible from the circulation desk area, and adjacent rooms need to have glass walls for ease of supervision purposes. Utilize short shelving in central areas that does not block viewing other areas. The backs of computers need to be accessible for maintenance purposes. Natural lighting is desirable, but the location of computers and shelving must not cause computer screen glare and book binding deterioration problems. The library/ media center or adjacent spaces may contain a computer lab, multimedia editing, a classroom, conference rooms, a staff library or workroom, and community user spaces. Consider locating some collections, research and reference materials in common spaces next to classrooms.

learning activities: activities which help students learn and apply information literacy and research skills using available resources and technology to access, retrieve, organize, and manage information. This would include individual student reading and research, computer and Internet use, multimedia editing, small and large group instruction, and discussion. The middle level school library/media center is the main source of information for class projects and personal interests, and adolescents need both guided and independent learning experiences. Tailor learning activities to different student developmental levels. Providing staff development in the use of information technologies supports the curriculum and student work towards graduation standards. Carefully consider the locations, space allocations, and relationships of computer work stations, computer labs, multimedia production, and other learning spaces that may become part of the library/media center program. The computer lab that becomes part of the library/media center should be a research lab accommodating a class of students.

learning aids, equipment, technology: portable and adjustable shelving, chairs, carrels, tables and desks, computers with Internet access, printers, VCR's and tapes, newspapers and magazines, maps, audio visual equipment, display cases and bulletin boards, and other furniture and equipment suitable to middle level student interests. Design and equip library/media centers to help students become familiar with current and emerging voice, video, and data technologies. Plan for student work or production areas with an accessible copy machine. Provide adult-sized furniture for staff and visitor use. Plan connectivity and networking accessibility to the library/media center and other sources of information from classrooms, homes, other schools, and information centers (e.g. public library). Plan accessibility and work stations for students with disabilities.

storage, other needs: large storage spaces and floor space for certain materials (e.g. newspapers, reference books) may no longer be necessary because of computer access to such materials. Provide ample and secure storage spaces for student and staff materials and equipment. Carts for hauling books and equipment are essential. Carpeting, acoustics, lighting, temperature and humidity control, and ventilation need careful consideration. Providing for the smooth traffic flow of classes in and out of the library/media center is important. Plan to electronically automate, secure, and back-up library/media center operations. Air condition for summer use. The library/media center should be flexible in design to accommodate emerging technologies and changing user needs.

Sources:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>FACILITIES GUIDELINES FOR LIBRARY/MEDIA PROGRAMS</i>	<i>MARYLAND STATE DEPARTMENT OF EDUCATION, 1998</i>
<i>GUIDELINES FOR MINNESOTA SCHOOL MEDIA PROGRAMS</i>	<i>MINNESOTA EDUCATIONAL MEDIA ORGANIZATION, 1992</i>

(f) Technology

Technology needs to be made available to students, staff, and community users in increasingly diverse forms and settings, including classrooms, media centers, offices and support spaces, as well as in computer labs. Each school district and school must design and deliver technology in the forms and settings that best meet the needs of students, staff, and community users.

Computer Labs

Essential elements to consider for middle level school computer labs include:

square footage: 1000-1300 square feet for 20-30 students in a computer lab, including a teacher demonstration area. For support spaces, provide 540-640 square feet for a technology closet and control and head rooms, 500-800 square feet for a copy center.

location: near classrooms or a grade house, or the library/media center. Avoid light glare from windows that creates screen vision problems. Design the computer lab as a separate, stand-alone lab, or with a wall or partition separating classroom areas from the lab. The teacher needs to be able to view as many computer screens as possible. Secure the lab for after-hours use by students and community users, and locate it near a convenient entrance.

learning activities: acquiring word processing and some desktop publishing skills, becoming familiar with spreadsheets and data base applications, and developing research and presentation skills using the Internet and graphics. The primary purpose(s) of the lab will help determine the arrangement of spaces for individual student, small group, and teacher demonstration learning activities.

learning aids, equipment, technology: computer desks, chairs, tables, and equipment should be portable and adjustable to accommodate the varying physical development and support needs of students, and the purpose of the lab. Networking, related equipment, and software must support the lab and its intended uses. Counter top space is necessary for student work projects. Provide a LCD projector and a pull-down screen for teacher demonstrations and for illustrating software applications. Provide work stations for lap top computers as appropriate. Plan computer work stations for students with disabilities.

storage, other needs: secure storage spaces for student work, teaching materials, and equipment are necessary. A security system is essential to ensure the safety of computer equipment and student work. The electrical and power setup for the network system and student work stations need careful planning. Lighting needs special attention to avoid screen glare and eye fatigue. Provide temperature, humidity control, and air conditioning to prevent computer lab overheating and for use during the summer. Consider a static-free carpeting or floor covering.

(g) Science

Essential elements to consider for a middle level school science lab or classroom/lab include:

square footage: 1100-1200 square feet for 24 students in a classroom/lab setting. Avoid overcrowded labs that are hazardous and reduce student "hands on" learning time. Plan an additional 300 square feet of space for lab preparation and the storage of specimens, chemicals, and materials. Several classrooms or labs may share preparation space.

location: cluster labs in an academic house setting and/or with other science labs. Locate labs on an outside wall to help vent fumes, and be accessible to an outdoor environmental study area. Several labs may share a classroom area with student desks, or include a classroom in a perimeter or peninsular lab set-up. The teacher needs to be able to observe all student lab work areas. Consider a "universal lab" that accommodates different preparation and lab work needs if several different classes (e.g. life science, earth science) are sharing a lab.

learning activities: individual and small group inquiry, pre/post-lab, and field-related activities. Stress lab safety throughout. Computer learning activities (e.g. simulations, data collection) should enhance, not replace lab or field activities.

learning aids, equipment, technology: extensive lab work requires enhancing student science lab stations with portable tables, sinks, electricity and heat, and student work space. A teacher's table with demonstration space and audio/visual/ data connections and controls are necessary. Provide microscopes, specimens, plants, chemicals, containers, specialized plant or animal work areas, and other materials and equipment. Computers and software must be available to supplement lab work. Provide adequate marker board and display/tackboard to display experiments and student work. The teacher lab preparation area needs a counter, large sink, and refrigerator. A rolling cart for teachers to transport lab materials is very helpful. Plan lab stations for students with disabilities.

storage, other needs: state and federal requirements for science labs, storage, ventilation, and safety codes are critically important and must be met. Review the checklists for science lab and chemical storage safety contained in the health and safety materials annually sent to school district superintendents. Exchange air regularly because of chemicals and other materials used in the lab. Provide student drawers and tote trays, and a variety of secure storage spaces for teacher and student supplies, equipment, and flammable and hazardous materials. Shut-off valves for electricity, gas, and water must be readily accessible. Supply and maintain safety supplies and equipment, including first aid supplies, safety glasses, gloves, a demonstration fume hood, shower/eye wash, and fire extinguisher(s).

Source:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>CAPITAL EXPENDITURE: HEALTH AND SAFETY REVENUE APPLICATION</i>	<i>DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1999</i>

(h) Special Education

Special education programs and services must provide for students with a range of disabilities, from mild to severe, and those with multiple disabilities. It is critically important to make a careful assessment of the projected number of special education students and the types of programs, staffing, and services needed. Next, determine program space needs and whether to locate resource and support spaces within or outside the classroom. Finally, design or modify spaces as appropriate (e.g. larger spaces are needed for severely disabled students). Advance planning will help schools avoid the cramming of special education students into storage, office, and other spaces not intended for instruction. All ADA and building code requirements for accommodating students with disabilities must be met. It is important to involve staff and architects with knowledge of programs and code (e.g. time-out room) requirements. Essential elements to consider for middle level school special education spaces include:

square footage: 450 square feet for 5-8 students in a smaller classroom setting, and 800-1200 square feet in a classroom/lab setting. Utilize portable dividers to help make all spaces as flexible as possible to allow for regular modifications. Computers and other accommodations for individual students may require additional square footage. Students with severe disabilities and/or personal hygiene needs may need separate, self-contained rooms or spaces for sinks, toilets, diapering, showering, changing, and laundry areas. Spaces for a time-out or quiet space room, kitchen facilities, and physical therapy and adaptive equipment may be necessary. It may be desirable to provide a room for observation, student/staff/parent conferences, and small group work.

location: first floor, near exit and lockers, food service, adaptive physical education, conference/testing, occupational/motor therapy, speech and music therapy rooms, and other related support service spaces.

learning activities: individual and small group learning activities, including general and computer instruction, life survival skills, and activities that meet the special learning needs of students. Plan to use work stations for students with disabilities that must be provided in all program areas such as consumer life science and technology education labs, physical education, music, art, and science as appropriate.

learning aids, equipment, technology: learning aids, equipment, and technology that meets individual student needs (e.g. audio and recording equipment), and special handrails, walks, ramps, and doors to assure student access to the school, classrooms, and all program and service spaces. Provide adjustable and portable tables, chairs, and desks, computer stations, ceiling or wall-hung video monitors, portable equipment, bookcases and adjustable shelving, counter and project work spaces, white/chalkboard, display/bulletin board, a sink, and audio visual equipment. Provide voice, video, and networked computer connections with Internet access to enable students to use technology to aid learning. Consider equipping classrooms with excess power and communications systems for future needs. Plan teacher work and demonstration spaces suitable for the program.

storage, other needs: provide ample, flexible, accessible, and portable storage spaces for student, teacher, and teacher aide materials, supplies, and equipment. Provide private work and office space for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine. The observation room needs to have a one-way mirror.

Utilize treated or reinforced wall board in classrooms or student traffic areas to prevent student damage. Provide many power outlets throughout the room, and consider capping the outlets. Use a combination of hard surface, resilient flooring and carpet for classroom and resource and support spaces. Classrooms should have rounded corners and be acoustically treated. Utilize natural gray colors, natural light, quality light fixtures (fluorescent lights cause problems for students with auditory and visual processing difficulties), and heating, ventilation, and air-conditioning and humidity control systems that produce good indoor air quality to improve the classroom environment, reduce absenteeism, and help student performance. Minimize the number of interior classrooms with no natural light. Air-condition enough classrooms for summer program use.

(i) Technical Education

Technical education includes labs, shops, and classrooms suitable for a variety of lifework development activities. At the middle level, programs are likely to be exploratory. Detailed specifications for labs or shops must be found in other sources. Essential elements to consider for middle level school technical education spaces include:

square footage: 1800-2400 square feet for up to 25 students in a technical education lab, 2000-3000 square feet in a general shop (woods/construction, metals, agribusiness), 1400-2000 square feet in a CADD/Graphics lab, and 1200-1400 square feet in a principles of technology lab. Provide an additional 500-600 square feet for storage, 150 square feet per teacher for offices, 850-950 square feet for a related classroom, 90-100 square feet for a tool room, and 120-300 square feet for a finishing room or other specialized space.

location: ground floor, with ready access to the outside through an over-sized overhead door for the delivery of materials, machinery, and equipment. Several shops or labs may share related classrooms. Building codes require separating incompatible activities (e.g. dust and dust-free, flammable and non-flammable activities) within or between shops. Use non-load bearing walls to separate labs, shops and related areas, and to facilitate redesigning for changing program needs.

learning activities: general background, demonstration, exploration, and project work activities in a lab, shop, or classroom setting. Technology labs often include separate spaces for video production and/or photography, and need access to both Intranet and Internet networks. Provide flexible student work stations to allow for multiple activities. Teachers need to have clear vision of all work areas in a lab or shop. Consider installing interior windows to provide supervision of adjacent labs and shop areas. Plan work stations for students with disabilities.

learning aids, equipment, technology: a variety of work stations, equipment, machines, technology, and hand and power tools for labs, shops, and classrooms. Provide work surfaces suitable for the learning activities and the equipment and tools used. Adequate work space is essential, especially around hazardous machines. Provide for adequate ventilation and dust collection, power, and sound control. Labs with computers may require air conditioning. Ceilings, walls, floors, partitions, windows, and doors need special design consideration. Electrical demands may be heavy, and numerous power outlets and a master shut off switch are necessary. Install electrical troughs along the walls or overhead to ease the relocation of equipment. Lighting needs vary with the work station. An emergency eyewash station, first aid equipment, and fire extinguishers must be readily accessible. Provide safety glasses, operations guards, and other safety protection for students. All power equipment must meet local, state, and OSHA mechanical and electrical requirements, as well as safety codes. Provide a sink and supplies for clean up. Floors should have non-skid preparation. Danger zones should be outlined with painted lines. Static free flooring or carpeting is desirable in some work areas.

storage, other needs: provide ample and secure storage areas for small and large student projects, tools, materials, and equipment in use and not in use to maintain student safety and the learning environment. Storage areas need to be sized to the materials. Tool cribs and wall mounted tool cabinets need to be part of all spaces which require hand tools, hand power tools, and machine tools. Consider a security system to ensure the safety of the equipment and student work. Provide work and office space for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine.

(j) Family and Consumer Science

Essential elements to consider for middle level school family and consumer science spaces include:

square footage: 900-1000 square feet in a classroom space, or 1200-1500 square feet in a multipurpose lab or classroom/lab for 20-24 students. Provide classroom or classroom/lab spaces for student seating, teacher demonstration, lab work such as food preparation and serving, related student learning activities, and storage. Plan food/nutrition labs as specialized labs or as part of a multipurpose classroom/lab. Provide flexible spaces with portable walls or room dividers to accommodate changing program needs.

location: first floor, near an entrance for the delivery of materials.

learning activities: individual, small group, and large group learning activities in foods/nutrition, clothing, child care, personal and family resource management, and careers. Plan work stations for students with disabilities.

learning aids, equipment, technology: portable tables and chairs, carts, cabinets, mirrors, sewing machines, bookcases with adjustable shelving, counter and project work spaces, white/chalkboard, tack/bulletin boards in several areas, computer stations, ceiling or wall-hung video monitors, audio-visual equipment, and teacher demonstration space. Provide portable equipment for use in the multipurpose areas. For the foods/nutrition lab, provide preparation equipment, large and small appliances, sinks, waste disposal unit, cooking and baking utensils and supplies, linens, cleaning supplies, and serving carts. Supply and maintain first aid equipment (fire cleaning extinguishers and blankets). Provide voice, video, and networked computer connections with Internet access to enable students to use technology to aid learning.

storage, other needs: provide adequate storage spaces, some secure, for equipment, supplies, teacher materials, and student project work. In the foods/nutrition lab, a variety of wall and base cabinets are necessary, and in most all other areas, portable storage units, tote trays, bookcases, and carts are essential. Plan acoustics, lighting, temperature and humidity controls, sound control, and sufficient ventilation to prevent food preparation fumes. Plumbing is very important in the food lab, where a hot water and gas supply is essential. Electrical service demands are heavy in family and consumer science; therefore, plan outlets and control panel locations to afford both permanent and flexible arrangements of equipment. Select floor coverings with ease of maintenance in mind, especially in the food lab. Provide work and office space for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine.

(k) Art

Essential elements to consider for middle level school art rooms include:

square footage: 1200-1500 square feet for 20-28 students in a multipurpose, drawing and painting, or ceramics room, 400 square feet for a kiln and a glazing/clay/damp room, 300 square feet for storage spaces in each area, and 120 square feet per teacher for office space. A photography room needs 1000 square feet and a darkroom 400-800 square feet.

location: first floor in an area with plenty of indirect natural light, near an entrance for the delivery of materials, and an outdoor area for art activities such as sketching. Provide separate rooms free of dust for computer graphics and audio-visual equipment, and a fire-protected and well-ventilated room for the kiln. Use non-load bearing walls or partitions to separate work areas.

learning activities: a variety of learning activities in two or three dimensional media, wet and dry, including painting, clay, block printing, etching, lithography, metals, jewelry, weaving, plastics, modeling, sculpture, photography, and computer drawing and graphics. Teachers need to have clear vision of all art work areas. Provide flexible work stations within art rooms to allow for multiple activities and changing program needs. Plan work stations for students with disabilities.

learning aids, equipment, technology: portable work surfaces including single, double, and/or four-student art tables, stools, easels, ceramic benches, potters wheels, and clay carts. Provide powered work counters with sinks accessible from more than one side, drying racks, tool panels, and a work area with a large mirror. Plan for computer stations, ceiling or wall-hung video monitors, audio-visual equipment, and the darkening of the room for showing slides, films, and spotlighting. Provide a room ceiling grid system, cork board, and deep, adjustable display cases off the corridor or in other areas of the school (e.g. library, lobby) to display student work. Flooring which is easily maintained and resistant to water, cleaning solvents, and oil is essential. Concrete with floor drains is best for heavy-duty work areas (e.g. clay). Provide voice, video, and networked computer connections with Internet access to enable students to use technology to aid learning.

storage, other needs: providing a variety of ample storage spaces with adjustable shelving, drawers, and cabinets, some secure, for student projects, teacher materials, tools, paints, acids, solvents, cleaners, and bulk supplies of materials and equipment is critical. Plan for ceilings to be 10-14 feet high, and install ventilation and exhaust hoods to handle fumes, odors, dust, and contaminant vapors. Provide multiple sinks with strainers and sediment interceptor traps that are easily accessible to students for fast cleanup. Supply and maintain a fire extinguisher and emergency washing facilities. Plan wiring, electrical, and gas supply outlets, including accessible master and emergency shutoff switches/valves for safety. Provide work and office space for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine.

(I) Music

Music spaces are a frequent component of additions to middle level schools because of large class sizes and the need for spaces to play, sing (including choreography and movement), listen, practice, and store equipment. Essential elements to consider for middle level school music spaces include:

square footage: the variety of music classes and group sizes requires a more specific breakdown of music spaces. Plan square footage for the maximum desirable class size, not current enrollments. Provide adequate ceiling heights to create a satisfactory listening environment, regardless of class size.

<u>Program/Function</u>	<u>45-60 Students</u>	<u>90 Students</u>	<u>Ceiling Height</u>
Instrumental	1500-2000 sq. ft.	2700 sq. ft.	18'-22'
Choral	1200-1500 sq. ft.	2000 sq. ft.	16'-20'

General Music Classroom	1000-1200 sq. ft. for 25-30 students
Instrument Storage Room.....	600-800 sq. ft. or 4 sq. ft per instrument
Small Practice Rooms	40-60 sq. ft. for 1-2 students
Group Practice/Lesson Rooms	75-100 sq. ft. for 3-6 students
Electronic Keyboarding Lab	500-750 sq. ft. for 11-21 work stations
Music Library	150-200 sq. ft. per 150 students
Office/Lesson Studio.....	100-200 sq. ft. per teacher
Instrument Repair	50-75 sq. ft.
Performance Equipment Storage	200-300 sq. ft for risers, portable acoustic shell, platforms, etc.

location: a separate, secured wing to minimize noise problems, and adjacent to the stage and athletic fields for indoor/outdoor performances, and to a parking lot for loading and transporting equipment. The internal arrangement of music spaces is critical--locate storage, office spaces and corridors between the instrumental and choral rehearsal rooms. Practice rooms should not open directly into the rehearsal rooms to minimize disruptive sound transmissions. Provide wide doors for the easy and quick movement of students and equipment. Plan for multiple entrances and exits, double doors, and wide corridors and commons spaces to efficiently move large numbers of students, pianos, and large percussion equipment in and out of music and performance areas. Locate teacher offices to maximize visible supervision. Separate the music library from other storage areas.

learning activities: listening, playing, and singing and expressing through sound and physical movement. Provide spacious rooms with sound isolation and acoustic clarity in order to provide the best quality music learning environments. Plan to accommodate students with disabilities who are increasingly involved in music programs.

learning aids, equipment, technology: portable or built-in semi-circular risers provide better sight-lines in both instrumental and choral rooms. Provide space in front of the rehearsal room for a teacher's podium, piano, cabinets, tack boards, recording/playback equipment, and white boards equipped with staff lines on one half the surface. Plan to purchase and use school-owned instruments, music posture chairs and music stands, an instrument repair bench, a large sink and tools, and robes and uniforms are necessary. Install adequate playback/recording equipment in all music spaces, including performance areas, and networked phone jacks in the keyboarding lab.

Provide quiet mechanical systems and HVAC systems to increase air exchange and maintain the integrity of the listening environment. Equip florescent lights with quiet-rated electronic ballasts to prevent the "hum" characteristic of standard ballasts. Treat interior wall and ceiling surfaces of rehearsal rooms with a mixture of diffusive and absorptive materials or panels to create good musical communication within the room. Carpets are not effective musical sound absorbers. Use acoustically rated doors to prevent sound transmission in and out of music spaces. Provide ample electrical power outlets throughout all music rooms, including on floors for electronic instruments.

storage, other needs: provide walk-through storage for most or all instruments adjacent to, not within instrumental rehearsal rooms. Plan a variety of secure, well-ventilated storage spaces, large and small, for instruments, uniforms, robes, music stands, and chair racks. Provide temperature and humidity control in instrument storage spaces. Plan for adequate ventilation in practice rooms, and install a large, double-glazed observation window in each door for student safety and teacher observation. Pre-engineered modular practice rooms provide the best guarantee for good sound isolation.

Locate toilets, changing areas, and drinking fountains near rehearsal and performance areas for student and community member use during off-school hours. Performance area users may have incompatible sound control needs, necessitating additional equipment such as acoustic shells, risers, and sound systems for musical events. Provide work and office space for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine. Consider air conditioning.

Sources:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>PLANNING GUIDE FOR SECONDARY MUSIC FACILITIES</i>	<i>WENGER CORPORATION, 1997 1-800-733-0393</i>
<i>MUSIC FACILITIES: BUILDING, EQUIPPING, AND RENOVATING</i>	<i>MENC, 1987 703-800-4000</i>
<i>THE SCHOOL MUSIC PROGRAM: DESCRIPTION AND STANDARDS, 2ND ED</i>	<i>MENC, 1986 703-800-4000</i>

(m) Physical Education/Athletics

Physical education and athletic activity space additions to middle level schools are very common. Schools must provide gender equality and full access for students with disabilities in all programs, services, and facilities. Recent trends include increasing interest in non-traditional individual activities such as exercise walking and fitness conditioning, and the need to accommodate the community drop-in recreational user in multipurpose spaces. Planning for physical education and athletic activity spaces must consider future program uses as well as student enrollment and community user trends; if one or more are positive, consider "over-building" to provide adequate spaces over the longer term at a cost savings. Essential elements to consider for middle level school physical education and athletic activity spaces include:

square footage: the variety of physical education and athletic activities for boys and girls users requires a more specific breakdown of indoor and outdoor spaces. For a middle level gymnasium, consider 5000-6000 square feet as one teaching station. Plan indoor and outdoor spaces for current and projected maximum usage during and after school by physical education, athletic, and community activities.

<u>Area/Program</u>	<u>Space Needed</u>
Gymnasium—Two Teaching Stations	10000-12000 sq. ft.
Multipurpose—Gymnastics, Wrestling	1700 sq. ft.
Weights/Fitness	1500 sq. ft.
Adaptive Physical Education	500 sq. ft.
Physical Education Locker Rooms	1 sq. ft per student capacity
Athletic Locker Rooms	1000-1500 sq. ft.
General Storage Rooms	300 sq. ft. per station
Athletic Storage Room	600-800 sq. ft.
Spectator Seating	8 sq. ft per person, open bleachers
Closed Bleachers	4 feet deep
Pool	10000-12000 sq. ft.
Diving Well	1500-2500 sq. ft.

In addition to inside facilities, school districts need to provide the acreage needed for current and future middle level school and community outdoor activities, including any shared spaces with the high school or elementary schools, or the city. **A minimum of 26+ acres should be set aside for outdoor physical education, athletic, and community recreational use activities.** The acreage below does not include buffer zones to allow for flow-through traffic, fencing, storage, parking, bleachers, or additional areas needed for future program needs, greater student participation, or community use.

TABLE VII
MIDDLE SCHOOL OUTDOOR ACTIVITY SPACES

AREA/ACTIVITY	RECOMMENDED DIMENSIONS (IN FEET)	SPACE REQUIRED SQUARE FEET	NUMBER REQUIRED	TOTAL REQUIRED SQUARE FEET	ACRES
MULTIPURPOSE	100 x 120	12,000	2	24,000	0.55
TRACK AND FIELD	320 x 600	192,000	1	192,000	4.41
FOOTBALL	160 x 360	57,600	2	115,200	2.64
SOCCER	225 x 360	81,000	2	162,000	3.72
SOFTBALL	270 x 270	72,900	4	291,600	6.69
BASEBALL	300 x 300	90,000	2	180,000	4.13
ARCHERY	90 x 225	20,250	2	40,500	0.93
DRIVING RANGE	80 x 600	48,000	1	48,000	1.10
TENNIS	48 x 120	5,760	8	46,080	1.06
GENERAL PURPOSE	100 x 200	20,000	2	40,000	0.92
			TOTAL	1,139,380	26.16

To accommodate additional outdoor activities, many school districts purchase additional acreage off the middle level school site, taking on additional student safety, transportation, and maintenance issues at a higher cost to the district while causing inconvenience to students, school staff, and parents. Consider "over-building" physical education and athletic spaces to provide adequate spaces over the longer term at a cost savings.

location: away from the academic classroom areas of the school to minimize classroom disruptions, with convenient, direct access to outdoor spaces and a parking lot for loading and transporting equipment. Provide several hallway approaches to the gymnasium and locker rooms to ease traffic congestion levels. Plan teacher and coach offices and locker rooms for ease of supervision. Provide for locking off indoor activity spaces from the rest of the school to permit after-hours access by students, community users, and parents with a minimum of security problems. Use wall partitions or nets to separate indoor teaching stations. Plan outdoor activity locations in relationship to their intensity and compatibility of use (e.g. general purpose fields should be nearest the building).

learning activities: developing motor skills, physical conditioning, and individual and team skills and interests through physical education and athletic activities. Physical education activities concentrate on developing lifetime fitness, sports, and recreational interests, while athletic activities concentrate on developing specific athletic skills and emphasize individual and team competition. Plan indoor and outdoor spaces and activities for students with disabilities.

learning aids, equipment, technology: provide specifically designed spaces for basketball, volleyball, weights/fitness, wrestling, gymnastics, dance, softball, track and field, soccer, football, etc., as well as the related equipment and supplies for physical education and athletic activities. This includes balls and bats, clubs, shot puts, mats, weights and fitness equipment, racquets, standards, parallel bars, floor plates and anchors, uniforms and protective gear, benches and dugouts, etc., in many sizes and/or adjustable for students at various levels of skill development. Consider built-in audio and tape equipment in weight and fitness rooms. Provide white/chalkboard, display/bulletin board, first aid and emergency equipment, and a public address sound system. Provide quiet mechanical systems and HVAC systems to increase air exchange in locker rooms, gymnasiums, and other activity stations.

storage, other needs: providing ample storage space for physical education and athletic programs is important, both for ease of access and security. Plan for storage rooms to be built flush with walls at all teaching stations, and convenient to outdoor activity areas. Provide portable means of hauling and securing equipment, and build off-season storage spaces. Carefully plan flooring, lower and upper walls, ceilings, acoustic treatment, heating and ventilation, and lighting needs for various activities that have different needs. Install recessed equipment such as drinking fountains, telephones, and fire extinguishers whenever possible, and enhance the lobby area with trophy cases. Plan easy road access to outdoor activity sites for students and spectators.

Locate toilets and drinking fountains near indoor and outdoor practice and contest areas for student and community member use during off-school hours. Locker room doors should not swing out into crowded corridors. Provide secure and durable locker units of various sizes for both physical education and athletic programs, including visiting teams. Girls' locker room spaces, service areas, and spaces for activities must be equitable in size and quality to boys'. Provide work and office space for teachers and coaches to prepare and store materials, and access a phone, computer with Internet access, and a printer and copy machine. Plan access to spaces for adults with disabilities.

The publication Accessible Outdoor Recreation Areas provides guidelines on routes of travel, surfacing materials, play field access, equipment, etc., pending final passage of design guidelines. School districts planning swimming pools need to consult the Minnesota Department of Health regarding requirements for swimming pools.

Sources:

<i>PUBLICATION</i>	<i>AVAILABLE FROM</i>
<i>FACILITY PLANNING FOR PHYSICAL EDUCATION, RECREATION, AND ATHLETICS</i>	<i>AMERICAN ALLIANCE FOR HEALTH, PHYSICAL EDUCATION, RECREATION AND DANCE, 1993</i>
<i>BEYOND THE FIELD HOUSE</i>	<i>SCHOOL PLANNING & MANAGEMENT, SEPTEMBER, 1996</i>
<i>ACCESSIBLE OUTDOOR RECREATION AREAS MANUAL 1997/1998</i>	<i>DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1998</i>

Part 3.07 Guidelines for High School Learning Spaces

(a) Organization, Program, and Design Considerations for High Schools

Planning and designing facilities for high school students is based in part on the graduation standards, including the basic skills standards and high standards, and local school district and school mission, goals, policies, learning program, and student and staff support service decisions. School organization, learning program, and support service designs help students apply basic skills, work towards graduation standards high standards, assist teachers in delivering curriculum, and provide students and staff support services as needed.

The diversity and complexity of school organization and programs (curriculum, services) increases from the elementary to the middle level to the high school due to a number of factors, which may include the following:

- the need to adapt curriculum and facilities to support student achievement of graduation standards high standards;
- a shift in emphasis on learning basic skills to exploration of subjects or areas of interest to preparation for post-secondary programs or employment;
- the need to provide more specialized programs and staff to help students prepare for post-secondary education and employment;
- mainstreaming students with disabilities in a wider variety of classroom, lab, and post secondary preparation settings;
- the need to provide more expansive athletic and performance arts facilities for students and coaches/advisors in a great variety of more competitive extracurricular programs for boys and girls;
- the more immediate impact of change on post-secondary preparation programs and spaces in a high school; and
- increasing community use of high school facilities.

High schools must prepare graduates to pursue post-secondary education and/or job training programs, enter the job market, and assume new adult roles as learners, workers, partners, parents, and citizens. Most young adults will sample different lifestyles and necessarily have to compete for places in education or training programs and jobs on a local, regional, national, even international basis. The great variety of emerging needs, opportunities, and challenges facing young adults demands comprehensive high school programs to service students, and flexible facilities that will accommodate an ever-changing panorama of needed programs to accomplish this goal.

A high school must be flexible and adaptable as programs change and spaces must be used for other purposes. High school organizational designs may encompass any or all of the following concepts: classrooms, large and small group, team learning, individual study and/or resource areas, lab activities, and other specialized spaces. High schools may cluster learning programs and support services in a variety of ways to enhance the learning program, including the following:

- high school grades in linear classrooms with enhanced technology;
- high school grades in department or interdisciplinary groupings areas with adjacent common resource and support service spaces;
- library/media center/technology center with central resource center, computer labs, video production or telecast, ITV/distance learning, technology control center, and public access area;
- performing arts area including music, art, drama/theater, and an auditorium;
- lifework development area including technical, business/marketing, and family and consumer science education;
- physical education, athletic, and community recreation area including gymnasiums and locker rooms, health classrooms, and other indoor and outdoor physical education, adaptive physical education, athletic, and community recreation spaces;
- cafeteria/commons, including food service, student commons, study hall, performance space, and student activity and community meeting rooms;
- administration and student/family support services including guidance counseling, career center, social/psychological services, student records and test data, health services, conference rooms, and other intermittent staff and services; and
- community education offices, rooms, and other community use/partnership spaces.

Title II of the Americans with Disabilities Act and Section 504 of the Rehabilitation Act require school districts to make all educational programs and services accessible to students and adults with disabilities. Schools must make appropriate modifications of rules, policies, and practices, and provide accommodations to assure accessibility. If accessibility requires altering the fundamental nature of a program (e.g. a student in a wheel chair wanting to participate in wrestling), providing accessibility to that program may not be necessary. Consider providing an optional activity.

In any renovation/remodeling project, school districts must remove all accessibility barriers. In a new school construction project, all accessibility requirements must be met. This includes exterior traffic, doors, and outdoor recreation areas, interior circulation, building features, doors, toilets and locker rooms, cafeteria/ dining and assembly/meeting areas, and classrooms, labs, and other spaces. The Accessibility Survey Tool will assist school districts in reviewing existing school facilities and in planning for new schools, and Accessible Outdoor Recreation Areas will provide the latest guidelines for outdoor spaces. When designing facilities, it is important to involve individuals who understand applicable codes and the functional impact of code requirements on programs and facilities.

A high school facilities planning team (see Section II) needs to determine the needed learning and school support spaces, and develop design options which will enhance the learning program and the delivery of curriculum and school support services. High school designs need to be flexible and allow for alternative classroom, small, or large group learning arrangements, and optional ways of providing students and staff support services. A well-designed high school needs to be able to meet current as well as projected learning program and support service needs.

Sources:

<i>FEDERAL LAW</i>	<i>TITLE/SECTION</i>
<i>AMERICANS WITH DISABILITIES ACT</i>	<i>TITLE II 1993</i>
<i>REHABILITATION ACT</i>	<i>SECTION 504 1973</i>
<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>ACCESSIBILITY SURVEY TOOL</i>	<i>MINNESOTA DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1999</i>
<i>ACCESSIBLE OUTDOOR RECREATION AREAS 1999</i>	<i>DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1999</i>

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(b) High School Learning Spaces Square Footage Guidelines

TABLE VIII
SQUARE FOOTAGE GUIDELINES FOR HIGH SCHOOL LEARNING SPACES

HIGH SCHOOL	LEARNING SPACES	SF
	CLASSROOMS	850 - 950
	LARGE GROUP	15 SF / STUDENT
	TEAM LEARNING AREAS	1500 - 2000
	SMALL GROUP CONFERENCE	150 - 200
	INDIVIDUAL LEARNING STATION	40 SF / STATION
LIBRARY / MEDIA CENTER	ENTRANCE, CIRCULATION, DISTRIBUTION	700 - 900
	SEATING, STACKS, COMPUTER ACCESS, REFERENCE	8 - 10% OF STUDENTS x 40 SF
	SMALL GROUP / CONFERENCE	150 - 200
	MULTIMEDIA PRODUCTION	300 - 400
	CLASSROOM	800
	WORKROOM / STORAGE	400 - 600
	PROFESSIONAL LIBRARY	200
TECHNOLOGY	COMPUTER LAB	1000 - 1400
	CONTROL AND HEAD ROOMS, CLOSETS	640 - 740
	COPY CENTER	500 - 800
	ITV / DISTANCE LEARNING	900
	TV / VIDEO STUDIO	1250
SCIENCE	CLASSROOM / LAB	1200 - 1400
	STORAGE / LAB PREP	350
SPECIAL EDUCATION	CLASSROOM (5 - 8 STUDENTS)	450
	CLASSROOM / LAB	800 - 1200
TECHNICAL EDUCATION	TECH LAB	1800 - 2400
	GENERAL SHOP	2000 - 3000
	CADD / GRAPHICS	1400 - 2000
	PRINCIPALS OF TECHNOLOGY	1200 - 1400
BUSINESS/MARKETING EDUCATION	CLASSROOM	1000 - 1200
	CLASSROOM / LAB	1200 - 1400
FAMILY AND CONSUMER SCIENCE	CLASSROOM	900 - 1000
	CLASSROOM / LAB	1200 - 1500
ART	MULTIPURPOSE	1200 - 1500
	DRAWING AND PAINTING	1200 - 1500
	CERAMICS	1500
	KILN, GLAZING, CLAY, DAMP ROOM	400 - 600
	STORAGE	350 / AREA
	PHOTOGRAPHY	1000 - 1200
	DARKROOM	400 - 800
	OFFICE	120

HIGH SCHOOL	LEARNING SPACES	SF
MUSIC	INSTRUMENTAL	2000 - 3000
	CHORAL	1500 - 2200
	GENERAL MUSIC	1000
	INSTRUMENT STORAGE	600 - 800 (4 SF / INSTRUMENT)
	UNIFORM STORAGE	300 - 400 (3 SF / UNIFORM)
	CHORAL ROBE STORAGE	150 - 250 (2.5 SQ. FT / ROBE)
	SMALL PRACTICE	40 - 60
	GROUP PRACTICE	75 - 100
	ENSEMBLE	350 - 450
	ELECTRONIC KEYBOARDING LAB	500 - 750
	RECORDING CONTROL ROOM	100 - 150
	MUSIC LIBRARY	150 - 200
	OFFICE / LESSON STUDIO	100 - 200
PHYSICAL EDUCATION / ATHLETICS	INSTRUMENT REPAIR	50 - 75
	PERFORMANCE EQUIPMENT STORAGE	200 - 300
	GYMNASIUM (TWO STATIONS)	10000 - 12000
	MULTIPURPOSE	3200
	WEIGHTS / FITNESS	2000 - 3200
	PHYSICAL EDUCATION LOCKER ROOMS	1 SF / STUDENT CAPACITY
	ATHLETIC LOCKER ROOMS	1500 - 3000
	GENERAL STORAGE	300 / STATION
	ATHLETIC STORAGE	1000 - 1200
	SPECTATOR SEATING	10 SF / PERSON—OPEN BLEACHERS
	TRAINING ROOM	200 - 400
	LAUNDRY	200
	POOL	10000 - 12000
	DIVING WELL	1500 - 2500
HIGH SCHOOL	STUDENT ENROLLMENT	SF
GROSS SQUARE FOOTAGE	LESS THAN 500	200 - 225
	500 - 999	190 - 220
	1000-1500	180 - 200
	1500-2000	170 - 190
	2000 PLUS	150 - 180
	FOR POOL ADD	10 - 12
	FOR AUDITORIUM ADD	10 - 12
	FOR COMMUNITY USE/PARTNERSHIP SPACES ADD...	

(c) Classrooms

Guidelines for classrooms apply to all non-specialized classrooms. These guidelines are meant to encourage the design of imaginative, flexible, accessible classrooms, or classrooms with adjacent common resource and support spaces, and to help avoid sterile, cramped classrooms lacking spaces for a variety of learning activities and storage. Essential elements to consider for high school classrooms include:

square footage: 850-950 square feet for 20-28 students. Determine appropriate classroom square footage by analyzing current and anticipated class sizes, staffing, needed space for technology and students with disabilities, and deciding whether common spaces (i.e. large group, team learning, small group, conference, and office spaces) will be located within or outside classrooms. If resource and support spaces and/or more than several computers are to be placed in the classroom, additional square footage is necessary. Consider providing additional space for technology for more advanced student project work and teacher applications of technology to the curriculum.

location: in quiet areas, near the library/media center. Consider clustering classrooms by grade-level, department, or interdisciplinary wings with adjacent common spaces for large group, team learning, small group, and individual student work on special projects, as well as teacher team planning space.

learning activities: individual, small, team, and large group activities in academic, elective, and life development classes, including computer applications. Provide spaces to display students' work. Students working on graduation standards may need additional space for small group and individual student project and demonstration learning activities. Consider providing space for additional technology stations as a greater number of curriculum and learning activities using technology are developed by teachers and students become more able to do project work using technology.

learning aids, equipment, technology: portable tables or desks and stackable chairs, adjustable shelving and bookcases, white/chalkboard, display/bulletin board, audio visual and other portable equipment, ceiling or wall-hung video monitors, and an overhead projector and screen. Provide voice, video, and networked computer connections with Internet access, required spaces for cable trays, wiring, and conduits, and adjustable computer furniture to enable students to use technology to aid learning. Consider equipping classrooms with excess power and communications systems for future needs. Plan work stations for students with disabilities.

Plan teacher work, demonstration, and equipment spaces to fit the curriculum. This would include providing magazine and periodical racks in English, real and computer software models of geometric figures in math, specialized maps and software reference materials in world geography, desk-top publishing software and equipment in journalism, and language lab stations in world language classes.

storage, other needs: provide ample, flexible, accessible, and portable storage spaces for student projects and teacher materials, equipment, and supplies. Provide shared work or office spaces for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine.

Utilize non-load bearing walls between classrooms to best maintain flexibility in classroom design and facilitate team teaching and multiple-class learning activities. Treat or reinforce wall board that is used in classrooms or student traffic areas to prevent student damage. Classroom acoustics need careful attention. Natural light and quality light fixtures are highly desirable, and heating, ventilation, and air-conditioning and humidity control systems that produce good indoor air quality will improve the classroom environment, reduce absenteeism, and help student performance. Minimize the number of interior classrooms with no natural light. Consider air-conditioning the entire building or at least enough classrooms for summer use by students and adults.

(d) Large Group/Team Learning/Small Group Conference /Individual Learning Station

These common resource and support spaces permit teachers to use a wider variety of instructional styles in working with students, and enable individual or groups of students to work independently on projects. Essential elements to consider high school large group, team learning, small group conference, and individual learning station spaces include:

square footage: 15 square feet per student in a large group space, 1500-2000 square feet for 125-175 students in a team learning space, 150-200 square feet for each small group, conference, or office space, and 40 square feet per student for each individual learning station. If classroom technology space is limited, consider providing space for technology learning stations in common spaces, which may require additional square footage.

location: adjacent to a cluster of academic classrooms. Spaces for large group, team learning, small group, and individual learning station activities may overlap. Planning common spaces should provide for ease of supervision by teachers.

learning activities: large group presentations, team learning, small group discussion and activities, student project work, and computer work or media production.

learning aids, equipment, technology: stackable chairs for large group presentations, portable tables for team and small group activities, counter and project work spaces, ceiling or wall-hung video monitors, audio visual and other portable equipment, and the ability to easily darken the large group space to use for audio visual presentations. Provide other equipment appropriate for the classes, groups, or students using common spaces (e.g. language or science lab stations, media production area). Provide connections for technology work stations along walls, and adjustable computer furniture. Plan work stations for students with disabilities.

storage, other needs: provide ample, flexible, accessible, and portable storage spaces for student and teacher work, equipment, and supplies. Graduation standards work may require additional storage spaces for student project work. Provide work or office space for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine.

(e) Library/Media Center

Library/media center additions to high schools are very common because of the need for library/media center spaces that can accommodate new technologies and increasing numbers of student and community users. School districts may want to consider "over-building" the library/media center to better accommodate rapidly changing information technologies and increasing users. Essential elements to consider for a high school library/media center include:

square footage: 700-900 square feet for entrance, circulation, and distribution, and 40 square feet times 8-10% of the student enrollment capacity for seating, stacks, computer access, and reading and reference work spaces (e.g. 2000 square feet for 50 students). Provide additional spaces for small group/conference rooms (150-200 square feet), multimedia production (300-400 square feet), a library classroom (800 square feet), workroom/storage space (500-700 square feet), and a professional library (200 square feet) whether in or adjacent to the library/media center. See Part 3.07 (f) for computer lab and other technology space requirements.

location: near academic classrooms on the first floor, and near an entrance convenient for the delivery of equipment and materials and community user access. Plan carefully the design specifications and space allocations for activities such as individual and group study and research, informal reading, group instruction, media production, and library administration. All student areas in the library/ media center should be visible from the circulation desk area, and adjacent rooms should have glass walls for ease of supervision purposes. Utilize short shelving in central areas that does not block viewing other areas. The backs of computers need to be accessible for maintenance purposes. Natural light is desirable, but the location of computers and shelving must not cause computer screen glare and book binding deterioration problems. The library/media center or adjacent spaces thereto may contain a computer lab, multimedia editing, a classroom, conference rooms, a staff library or workroom, and community user spaces. Some collections, research and reference materials may be located in common spaces next to classrooms.

learning activities: activities which help students learn and apply information literacy and research skills to efficiently access, retrieve, organize, manage, and evaluate information include individual and collaborative reading and research, computer, network, and Internet use, multimedia production, small and large group instruction, projects, and discussion. The high school library/media center is the link between the school and other libraries and sources of information for students, and high school students are capable of both independent and collaborative work. Tailor learning activities to student inquiries, research interests, and their desires to seek information to help them explore career paths and life directions. Providing staff development in the use of information technologies supports the curriculum and student work towards graduation standards. Carefully consider the locations, space allocations, and relationships of computer work stations, computer labs, multimedia production, and other learning spaces that may become part of the library/media center program. The computer lab that becomes part of the library/media center should be a research lab accommodating a class of students.

learning aids, equipment, technology: portable and adjustable shelving, chairs, carrels, tables and desks, computers with network and Internet access, printers, VCR's and tapes, newspapers and magazines, maps, specialized reference sources, audio visual equipment, display cases and bulletin boards, and other furniture and equipment suitable to high school student interests. Design and equip library/media centers to help students access current and emerging voice, video, and data technologies. Plan for student work or production areas with an accessible copy machine. Provide adult-sized furniture for staff and visitor use. Plan connectivity and networking accessibility to the library/media center, other local, national, and global library/media centers, and other sources of information. Plan accessibility and work stations for students with disabilities.

storage, other needs: large storage spaces and floor space for certain materials (e.g. newspapers, reference books) may no longer be necessary because of computer access to such materials. Provide ample and secure storage spaces for student projects and staff materials and equipment. Carts for hauling books and equipment are essential. Carpeting, acoustics, lighting, temperature and humidity control, and ventilation need careful consideration. Providing for the smooth traffic flow of classes in and out of the library/media center is important. Plan to electronically automate, secure, and back-up library/media center operations. Air condition for summer use. The library/media center should be flexible in design to accommodate emerging technologies and changing user needs.

Sources:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>FACILITIES GUIDELINES FOR LIBRARY/MEDIA PROGRAMS</i>	<i>MARYLAND STATE DEPARTMENT OF EDUCATION, 1998</i>
<i>GUIDELINES FOR MINNESOTA SCHOOL MEDIA PROGRAMS</i>	<i>MINNESOTA EDUCATIONAL MEDIA ORGANIZATION, 1992</i>

(f) Technology

Technology needs to be made available to students, staff, and community users in increasingly diverse forms and settings, including classrooms, media centers, offices and support spaces, as well as in computer labs. Each school district and school must design and deliver technology in the forms and settings that best meet the needs of students, staff, and community users.

Computer Labs

Essential elements to consider for high school computer labs include:

square footage: 1000-1400 square feet for 20-30 students in a computer lab, including a teacher demonstration area. For support and related spaces, provide 640-740 square feet for a technology closet and control and head rooms, 500-800 square feet for a copy center.

location: near classrooms or a department or interdisciplinary wing, or the library/media center. Avoid light glare from windows that creates screen vision problems. Design the computer lab as a separate, stand-alone lab, or with a wall or partition separating classroom areas from the lab. The teacher needs to be able to view as many computer screens as possible. Secure the lab for after-hours use by students and community users, and locate it near a convenient entrance.

learning activities: applying word processing and desktop publishing skills, using spreadsheets and data base applications, and presenting research using the Internet, graphics, and design. The primary purpose(s) of the lab will help determine the arrangement of spaces for individual student, small group, and teacher demonstration learning activities.

learning aids, equipment, technology: computer desks, chairs, tables, and equipment should be flexible, portable and adjustable to accommodate the varying physical development and support needs of students, and the purpose of the lab. Networking, related equipment, and software must support the lab and its intended uses. Counter top space is necessary for student work projects. Provide a LCD projector and a pull-down screen for teacher demonstrations and for illustrating software applications. Provide work stations for lap top computers as appropriate. Plan computer work stations for students with disabilities.

storage, other needs: secure storage spaces for student work, teaching materials, and equipment are necessary. A security system is essential to ensure the safety of computer equipment and student work. The electrical and power setup for the network system and student work stations need careful planning. Lighting needs special attention to avoid screen glare and eye fatigue. Provide temperature, humidity control, and air conditioning to prevent computer lab overheating and for use during the summer. Consider a static-free carpeting or floor covering.

ITV/Distance Learning

Available technology allows students at different school sites the opportunity to share a class or learning experience. Essential elements to consider for high school ITV (interactive television)/distance learning spaces include:

square footage: 900 square feet for up to 20 students, including equipment. Additional spaces are necessary for wiring and to store equipment. Providing a greater number of technologies (e.g. cable, satellite, fiber optics, fax, telephones, computers), requires greater space to install, use and store equipment.

location: in a quiet, academic area where traffic or noise will not interfere with broadcasts. Locate near a secured entrance for after-hours use and broadcasts. Provide accessible telephones and other interactive technology within the classroom.

learning activities: media presentation, demonstration, and student interaction activities using available technologies. Provide spaces for individual and small group work to accommodate different class and student needs. Install monitors at the front and rear of the classroom to permit the teacher and students from all sites to view each other.

learning aids, equipment, technology: ceiling or wall-hung monitors, cameras, including an overhead camera for display and demonstration, student and teacher desks on risers, microphones, modulators, demodulators, and switches, sound controls, a VCR, telephone lines, wiring and hook-ups for various technologies, and chalk/markerboard. Consider the addition of a computer for multimedia presentations. Utilize portable furniture and work units to maximize space flexibility.

To facilitate an ITV broadcast at another site, provide a cart to transport student and display cameras, and a monitor and computer (or the ability to connect to a monitor and computer) to another site. Provide connections into the network for the mobile equipment to broadcast from the remote classroom site.

storage, other needs: provide ample space for the use and storage of equipment within or adjacent to the ITV classroom.

TV/Video Studio

Essential elements to consider for a high school ITV/Video Studio include:

square footage: 1250 square feet for 10-15 students, including space(s) for video production, editing, broadcasting, and equipment. Provide separate and secure enclosed spaces for broadcasting equipment, controls, and editing.

location: in a quiet, academic area where traffic, noise, vibrations, or visual access will not interfere with video recordings. Locate near a secure entrance for after-hours use of the TV/Video studio.

learning activities: individual and small group video production activities for use in multimedia presentations or local cable broadcasts. Implementation of the graduation standards will create additional opportunities for students to produce videos to help them achieve high standards.

learning aids, equipment, technology: cameras on tripods, studio lighting, monitors, switchers, modulators and demodulators, microphones, sound mixers and controls, video playback and editing equipment, intercom system, and materials and equipment to construct sets.

storage, other needs: provide storage spaces for equipment, a secure area for modulators and demodulators to control broadcast settings, and archives for tapes.

(g) Science

Essential elements to consider for high school science labs or classroom/labs include:

square footage: 1200-1400 square feet for students in a classroom/lab setting. Avoid overcrowded labs that are hazardous and reduce student "hands on" learning time. Plan an additional 350 square feet of space for lab preparation and the storage of specimens, chemicals, and materials. Several classrooms or labs may share preparation space.

location: cluster labs in an academic wing or with other science labs. Locate labs on an outside wall to help vent fumes, and accessible to an outdoor environmental study area. Several labs may share a classroom area with student desks, or include a classroom in a perimeter or peninsular lab set-up. The teacher needs to be able to observe all student lab work areas. Consider a "universal lab" that accommodates different preparation and lab work needs if several different classes (e.g. biology, chemistry) are sharing a lab.

learning activities: individual and small group inquiry, lab pre/post-lab, and integrated lab-field activities. Stress lab safety. Computer learning activities (e.g. graphics, data analysis) should enhance, not replace lab or field activities. Plan lab stations for students with disabilities.

learning aids, equipment, technology: extensive lab work requires enhancing student science lab stations with portable tables, sinks, electricity and heat, and student work space. A teacher's table with demonstration space and audio/visual/ data connections and controls are necessary. Provide microscopes, specimens, plants, chemicals, containers, specialized plant or animal work areas, and other materials and equipment. Provide unique supplies and work spaces for students working in special lab and field experiences. Student access to computer software to enhance student lab and field work is essential. Provide adequate marker board and display/tackboard to display experiments and student work. The teacher lab preparation area needs a counter, large sink, and refrigerator. A rolling cart for teachers to transport lab materials is very helpful. Plan lab stations for students with disabilities.

storage, other needs: state and federal storage, ventilation, and safety codes and requirements for science labs are critically important and must be met. Review the checklists for science lab and chemical storage safety contained in the health and safety materials annually sent to school district superintendents. Exchange air regularly because of chemicals and other materials used in the lab. Provide student drawers and tote trays, and a variety of secure storage spaces for teacher and student supplies, equipment, and for chemicals and flammable and hazardous materials. Shut-off valves for electricity, gas, and water must be readily accessible. Supply and maintain safety supplies and equipment, including first aid supplies, safety glasses, gloves, aprons, first aid supplies, a demonstration fume hood, shower/eye wash, and fire extinguisher(s).

Source:

PUBLICATION	AUTHOR
CAPITAL EXPENDITURE: HEALTH AND SAFETY REVENUE APPLICATION	DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1999

(h) Special Education

Special education programs and services must provide for students with a range of disabilities, from mild to severe, and those with multiple disabilities. It is critically important to make a careful assessment of the projected number of special education students and the types of programs, staffing, and services needed. Next, determine program space needs and whether to locate resource and support spaces within or outside the classroom. Finally, design or modify spaces as appropriate (e.g. larger spaces are needed for severely disabled students). Advance planning will help schools avoid the cramming of special education students into storage, office, and other spaces not intended for instruction. All ADA and building code requirements for accommodating students with disabilities must be met. It is important to involve staff and architects with knowledge of programs and code (e.g. time-out room) requirements. Essential elements to consider for high school special education spaces include:

square footage: 450 square feet for 5-8 students in a smaller classroom setting, and 800-1200 square feet in a classroom/lab setting. Utilize portable dividers to help make all spaces as flexible as possible to allow for regular modifications. Computers and other accommodations for individual students may require additional square footage. Students with severe disabilities and/or personal hygiene needs may need separate, self-contained rooms or spaces for sinks, toilets, diapering, showering, changing, and laundry areas. Spaces for a time-out or quiet space room, kitchen facilities, and physical therapy and adaptive equipment may be necessary. It may be desirable to provide a room for observation, student/staff/parent conferences, and small group work.

location: first floor, near exit and lockers, food service, adaptive physical education, conference/testing, occupational/motor therapy, speech and music therapy rooms, and other related support service spaces.

learning activities: individual and small group learning activities, including general and computer instruction, life survival skills, and activities that meet the special learning needs of students. Plan to use work stations for students with disabilities that must be provided in all program areas such as consumer life science and technology education labs, physical education, music, art, and science as appropriate.

learning aids, equipment, technology: learning aids, equipment, and technology that meets individual student needs (e.g. audio and recording equipment), and special handrails, walks, ramps, and doors to assure student access to the school, classrooms, and all program and service spaces. Provide adjustable and portable tables, chairs, and desks, computer stations, ceiling or wall-hung video monitors, portable equipment, bookcases and adjustable shelving, counter and project work spaces, white/chalkboard, display/bulletin board, a sink, and audio visual equipment. Provide voice, video, and networked computer connections with Internet access to enable students to use technology to aid learning. Consider equipping classrooms with excess power and communications systems for future needs. Plan teacher work and demonstration spaces suitable for the program.

storage, other needs: provide ample, flexible, accessible, and portable storage spaces for student, teacher, and teacher aide materials, supplies, and equipment. Provide private work and office space for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine. The observation room needs to have a one-way mirror.

Utilize treated or reinforced wall board in classrooms or student traffic areas to prevent student damage. Provide many power outlets throughout the room, and consider capping the outlets. Utilize a combination of hard surface, resilient flooring and carpet for classroom and resource and support spaces. Classrooms should have rounded corners and be acoustically treated. Utilize natural gray colors, natural light, quality light fixtures (fluorescent lights cause problems for students with auditory and visual processing difficulties), and heating, ventilation, and air-conditioning and humidity control systems that produce good indoor air quality to improve the classroom environment, reduce absenteeism, and help student performance. Minimize the number of interior classrooms with no natural light. Air-condition enough classrooms for summer program use.

(i) Technical Education

Technical education includes labs, shops, and classrooms suitable for a variety of lifework development activities discussed below. Detailed specifications for labs or shops must be found in other sources. Essential elements to consider for high school technical education spaces include:

square footage: 1800-2400 square feet for up to 25 students in a technical education lab, 2000-3000 square feet in a general shop (woods/construction, metals, agribusiness, auto/small engines) 1400-2000 square feet in a CADD/Graphics lab, and 1200-1400 square feet in a principles of technology lab. Provide an additional 500-600 square feet for storage, 150 square feet per teacher for office space, 850-950 square feet for a related classroom, 540-600 square feet for a greenhouse, 90-100 square feet for a tool room, and 120-300 square feet for a finishing room.

location: ground floor, with outside access through an over-sized overhead door for the delivery of materials, machinery, equipment, and vehicle entry. A separate wing for labs, shops, and related classrooms will maximize the sharing of spaces. Building codes require separating incompatible activities (e.g. dust and dust-free, flammable and non-flammable) within shops. Use non-load bearing walls to separate labs and shops to facilitate redesigning for changing programs.

learning activities: general background, demonstration, project work, occupational exploration, or job entry preparation in a lab, shop, or classroom setting. Technology labs often include separate spaces for video production and/or photography, and need access to both Intranet and Internet networks. Plan flexible work stations and arrange equipment and machines emphasizing safety, work procedures, multiple activities, and the easy flow of materials and efficiency. Teachers need to have clear vision of all work areas. Consider installing interior windows to provide supervision of adjacent labs and shop areas. Plan work stations for students with disabilities.

learning aids, equipment, technology: a variety of equipment, machines, technology, hand and power tools, and work surfaces for labs, shops, or classrooms. Providing adequate work space is essential, especially around hazardous machines. Plan for adequate ventilation and dust collection. Ceilings, walls, floors, partitions, windows, and doors need special design consideration. Electrical demands are heavy, and numerous power outlets and a master shut off switch are necessary. Install electrical troughs along the walls or overhead to ease relocation of equipment. Provide gas outlets and fume heads as needed. Lighting needs vary with the work station. An emergency eyewash station, first aid equipment, and fire extinguishers must be readily accessible. Provide safety glasses, operation guards, and other safety protection for students. All power equipment must meet local, State, and OSHA mechanical and electrical requirements, as well as safety codes. Provide a sink for clean up. Danger zones should be outlined with painted lines. Non-skid, static free flooring or carpeting is desirable in some areas.

storage, other needs: provide ample and secure storage areas for small and large student projects, tools, materials and equipment in use and not in use to maintain student safety and the learning environment. Storage areas need to be sized to the materials; e.g., lumber or steel stock storage areas may need to be up to 21 feet in length. Tool cribs and wall mounted tool cabinets need to be part of all spaces which require hand tools, hand power tools and machine tools. Consider a security system to ensure the safety of the equipment and student work. Provide work and office space for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine.

(j) Business/Marketing Education

Specifications for general business/marketing education spaces at the high school level are the focus of this part. Specialized school-to-work program spaces may need additional space and equipment, and specifications for those spaces must be found in other sources. Essential elements to consider for high school business/marketing education spaces include:

square footage: 1000-1200 square feet for up to 25 students in a multipurpose classroom, and 1200-1400 square feet for 25-35 students in a classroom/lab setting. Course offerings appropriate for a multipurpose classroom include general business, marketing, accounting, business law, consumer economics, and advanced courses in these same areas. Determine the appropriate size for each classroom or lab by analyzing current and projected student enrollments, and specifying the desirable furnishings and equipment. Utilize portable walls or room dividers to separate classrooms or lab work areas where appropriate. Teacher offices require additional space.

location: cluster business/marketing education classrooms in one area. Various designs and layouts are possible, and flexibility to accommodate changing program needs is essential. Consider locating near an exit for evening and community use.

learning activities: teaching students essential skills (e.g. word processing, spreadsheets, data base applications), orienting students to the world of business, and helping students prepare for the transition from school to work and for more specialized training in business/marketing education related fields.

learning aids, equipment, technology: ergonomically-designed desks, chairs, tables, files, computer work stations, ceiling or wall-hung monitors, and audio visual equipment. Provide adjustable and portable furnishings and equipment whenever possible, counter work space, and ample chalk/white board and display space. Design computer work stations with networking and place in a lab or individually in a classroom as needed. Carefully design AC power, air conditioning and humidity control. Plan work stations for students with disabilities.

storage, other needs: provide space for a teacher demonstration stand or work area. Install power outlets on the perimeter and in the floor, and provide a master circuit control switch for safety and to be able to turn off all equipment. Provide lighting for close work, acoustical treatment for noise control, and storage spaces for materials, projects, and equipment.

(k) Family and Consumer Science

Essential elements to consider for high school family and consumer science spaces include:

square footage: 900-1000 square feet in a classroom space, or 1200-1500 square feet in a multipurpose classroom/lab space for 20-24 students. Classroom or lab spaces need to be provided for student seating, teacher demonstration, lab work such as food preparation and serving, various student learning activities, and storage for student project work and equipment. Plan food/nutrition labs as specialized labs or as part of a multipurpose classroom/lab. It is important that family and consumer science spaces are flexible with portable walls or room dividers to accommodate changing program needs.

location: first floor, near an entrance for delivery of materials and for ease of access for children and parents in a child care or parenting program. Separate kitchen areas and child care facilities.

learning activities: individual, small group, and large group learning activities in foods/nutrition, clothing, child care, housing, health and home safety, personal and family resource management, and careers. Plan work stations for students with disabilities.

learning aids, equipment, technology: portable tables and chairs, carts, cabinets, wardrobes, mirrors, sewing machines, home furnishings, bookcases with adjustable shelving, counter and project work spaces, white/chalkboard, tack/bulletin boards in several areas, computer stations, ceiling or wall-hung video monitors, audio-visual equipment, and teacher demonstration space. Provide portable equipment for use in the multipurpose areas. For the foods/nutrition lab, provide preparation equipment, large and small appliances, sinks, a waste disposal unit, cooking and baking utensils and supplies, linens, cleaning supplies, and serving carts. Install an observation room with a two-way mirror and a speaker system for child development/parenting. Plan for increasing the number of related play and activity spaces, both indoors and outdoors, as the number of participating children increases. Supply and maintain first aid equipment (fire cleaning extinguishers and blankets). Provide voice, video, and networked computer connections with Internet access to enable students to use technology to aid learning.

storage, other needs: provide adequate storage spaces, some secure, for equipment, supplies, teacher materials, and student project work. Install a variety of wall and base cabinets in the foods/nutrition lab, and use portable storage units, tote trays, and carts in most all other areas. Plan acoustics, lighting, temperature and humidity controls, sound control, and sufficient ventilation to prevent food preparation fumes. Plumbing is very important in the food lab, where a hot water and gas supply is essential. Install a changing area and toilet for child care and clothing. Electrical service demands are heavy in family and consumer science; therefore, plan outlets and control panel locations to afford both permanent and flexible arrangements of equipment. Select floor coverings with ease of maintenance in mind, especially in the food lab. Provide work and office space for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine.

(I) Art

Essential elements to consider for high school art rooms include:

square footage: 1200-1500 square feet for 20-28 students in a multipurpose, drawing and painting, or ceramics room, 400-600 square feet for a kiln and a glazing/clay/damp room, 350 square feet for storage spaces in each area, and 120 square feet per teacher for office space. A photography room needs 1000 square feet and a darkroom 400-800 square feet.

location: first floor in an area with plenty of indirect natural light, near an entrance for the delivery of materials, an outdoor area for art activities such as sketching, and close to other performing arts areas to facilitate coordination of activities. Provide separate rooms free of dust for computer graphics and audio-visual equipment, and a fire-protected and well-ventilated room for the kiln. Use non-load bearing walls or partitions to separate work areas.

learning activities: a variety of learning activities in two or three dimensional media, wet and dry, including painting, printing, etching, lithography, metals, jewelry, weaving, plastics, modeling, sculpture and ceramics, photography, and computer drawing and graphics. Teachers need to have clear vision of all art work areas. Provide flexible work stations to allow for multiple activities and changing program needs. Plan work stations for students with disabilities.

learning aids, equipment, technology: portable work surfaces including single, double, and/or four-student art tables, stools, easels, model stands, ceramic benches, potters wheels, and clay carts. Provide powered work counters with sinks accessible from more than one side, drying racks, tool panels, and a work area with a large mirror and stands for modeling. Plan for computer stations, ceiling or wall-hung video monitors, audio-visual equipment, and the darkening of the room for showing slides, films, and spotlighting. Provide a room ceiling grid system, cork board, and deep, adjustable display cases off the corridor or in other areas of the school (e.g. library, lobby) to display student work. Flooring which is easily maintained and resistant to water, cleaning solvents, and oil is essential. Concrete with floor drains is best for heavy-duty work areas (e.g. clay). Provide voice, video, and networked computer connections with Internet access to enable students to use technology to aid learning.

storage, other needs: providing a variety of ample storage spaces with adjustable shelving, drawers, and cabinets, some secure, for student projects, teacher materials, tools, paints, acids, solvents, cleaners, and bulk supplies of materials and equipment is critical. Plan for ceilings to be 10-14 feet high, and install ventilation and exhaust hoods to handle fumes, odors, dust, and contaminant vapors. Provide multiple sinks with strainers and sediment interceptor traps that are easily accessible to students for fast cleanup. Supply and maintain a fire extinguisher and emergency washing facilities. Plan wiring, electrical, and gas supply outlets, including accessible master and emergency shutoff switches/valves for safety. Provide work and office space for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine.

(m) Music

Music spaces are a frequent component of additions to high schools because of large class sizes and the need for spaces to play, sing, listen, practice, and store equipment. Essential elements to consider for high school music spaces include:

square footage: the variety of music classes and group sizes requires a more specific breakdown of music spaces. Plan square footage for the maximum desirable group size, not current enrollments. Adequate ceiling heights are necessary to provide a satisfactory listening environment, regardless of class size.

<u>Program/Function</u>	<u>60-75 students</u>	<u>90 students</u>	<u>Ceiling Height</u>
Instrumental	2000-2500 sq. ft.	3000 sq. ft.	18'-22'
Choral	1500-1800 sq. ft.	2200 sq. ft.	16'-20'

General Music Classroom	1000 sq. ft. for 25-35 students
Instrument Storage Room.....	600-800 sq. ft. or 4 sq. ft. per instrument
Uniform Storage	300-400 sq. ft., or 3 sq. ft. per uniform
Choral robe storage	150-250 sq. ft. or 2.5 sq. ft per robe
Small Practice Rooms	40-60 sq. ft. for 1-2 students
Group Practice/Lesson Rooms	75-100 sq. ft. for 3-6 students
Small Ensemble Practice Room	350-450 sq. ft. for up to 15 students
Electronic Keyboarding Lab	500-750 sq. ft. for 11-21 work stations
Recording Control Room	100-150 sq. ft.
Music Library	150-200 sq. ft. per 150 students
Office Lesson Studio.....	100-200 sq. ft. per teacher
Instrument Repair	50-75 sq. ft.
Performance Equipment Storage	200-300 sq. ft. for risers, portable acoustic shell, platforms, etc.

location: a separate, secured wing to minimize noise problems, and adjacent to the stage and athletic fields for indoor/outdoor performances, and to a parking lot for loading and transporting equipment. The internal arrangement of music spaces is critical--locate storage, office spaces and corridors between the instrumental and choral rehearsal rooms. Practice rooms should not open directly into the rehearsal rooms to minimize disruptive sound transmissions. Plan for multiple entrances and exits, double doors, and wide corridors and commons spaces to efficiently move large numbers of students, pianos, and large percussion equipment in and out of music rooms and performance areas. Locate teacher offices to maximize visible supervision. Separate the music library from other storage areas. Plan for the recording control room to be adjacent to the rehearsal room, and performance equipment storage space near the stage level of the auditorium or gym.

learning activities: listening, playing, and singing and expressing through sound and physical movement. Provide spacious rooms with sound isolation and acoustic clarity in order to provide the best quality music learning environments. Plan to accommodate students with disabilities who are increasingly involved in music programs.

learning aids, equipment, technology: portable or built-in semi-circular risers provide better sight-lines in both instrumental and choral rooms. Provide space in front of the rehearsal room for a teacher's podium, piano, cabinets, tack boards, recording/playback equipment, and white boards equipped with staff lines on one half the surface. Plan to purchase and use school-owned instruments, music posture chairs and music stands, an instrument repair bench, a large sink and tools, and robes and uniforms. Install adequate playback/recording equipment in all music spaces, including performance areas, and networked phone jacks in the keyboarding lab.

Provide quiet mechanical systems and HVAC systems to increase air exchange and maintain the integrity of the listening environment. Equip fluorescent lights with quiet-rated electronic ballasts to prevent the "hum" characteristic of standard ballasts. Treat interior wall and ceiling surfaces of rehearsal rooms with a mixture of diffusive and absorptive materials or panels to create good musical communication within the room. Carpets are not effective musical sound absorbers. Use acoustically rated doors to prevent sound transmission in and out of music spaces. Provide ample electrical power outlets throughout all music rooms, including on floors for electronic instruments.

storage, other needs: provide walk-through storage for most or all instruments adjacent to, not within instrumental rehearsal rooms. Plan a variety of secure, well-ventilated storage spaces, large and small, for instruments, uniforms, robes, music stands, and chair racks. Provide temperature and humidity control in instrument storage spaces. Plan for adequate ventilation in practice rooms, and install a large, double-glazed observation window in each door for student safety and teacher observation. Pre-engineered modular practice rooms provide the best guarantee for good sound isolation.

Locate toilets, changing areas, and drinking fountains near rehearsal and performance areas for student and community member use during off-school hours. Performance area users may have incompatible sound control needs, necessitating additional equipment such as acoustic shells, risers, and sound systems for musical events. Provide work and office space for teachers to prepare and store teaching materials, and access a phone, computer with Internet access, and a printer and copy machine. Consider air conditioning.

Sources:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>PLANNING GUIDE FOR SECONDARY MUSIC FACILITIES</i>	<i>WENGER CORPORATION, 1997 1-800-733-0393</i>
<i>MUSIC FACILITIES: BUILDING, EQUIPPING, AND RENOVATING</i>	<i>MENC, 1987 703-800-4000</i>
<i>THE SCHOOL MUSIC PROGRAM: DESCRIPTION AND STANDARDS, 2ND ED</i>	<i>MENC, 1986 703-800-4000</i>

(n) Physical Education/Athletics

Physical education and athletic activity space additions to high schools are very common. Schools must provide gender equality and full access for students with disabilities in all programs, services, and facilities. Recent trends include increasing interest in non-traditional individual activities such as exercise walking and fitness conditioning, and the need to accommodate the community drop-in recreational user in multipurpose spaces. The planning of physical education and athletic spaces, especially pools, stadiums, field houses, hockey arenas, and concession and public lobby areas requires the extensive involvement of staff, architects, regulatory agencies, and specialized consultants. Essential elements to consider for high school physical education and athletic activity spaces include:

square footage: the variety of physical education and athletic activities for boys and girls requires a more specific breakdown of indoor and outdoor spaces. For a high school gymnasium, consider 5000-6000 square feet as one teaching station. Plan indoor and outdoor spaces for current and projected maximum usage during and after school. Provide additional gymnasium, locker room, single/multipurpose, and outdoor spaces as student enrollments and participation in physical education and athletic activities, the number and levels (A, Junior Varsity, B teams) of competitive athletic programs, and community recreational use of spaces increase.

<u>Area/Program</u>	<u>Space Needed</u>
Gymnasium—Two Teaching Stations ..	10000-12000 sq. ft.
Multipurpose—Gymnastics, Wrestling ..	3200 sq. ft.
Weights/Fitness ..	2000-3200 sq. ft.
Adaptive Physical Education ..	500 sq. ft.
Physical Education Locker Rooms.....	1 sq. ft per student capacity
Athletic Locker Rooms ..	1500-3000 sq. ft.
General Storage Rooms.....	300 sq. ft. per station
Athletic Storage Room ..	1000-1200 sq. ft.
Training Room ..	200-400 sq. ft.
Laundry ..	200 sq. ft.
Spectator Seating.....	10 sq. ft per person, open bleachers
Closed Bleachers ..	4 feet deep
Pool.....	10000-12000 sq. ft.
Diving Well ..	1500-2500 sq. ft.

In addition to inside facilities, school districts need to provide the acreage needed for current and future high school and community outdoor activities, including any shared spaces with the middle level or elementary schools, or the city. **A minimum of 31+ acres should be set aside for outdoor physical education, athletics, and community recreational use activities.** The acreage below does not include buffer zones to allow for flow-through traffic, fencing, storage, parking, bleachers, or additional areas based on future program needs, greater student participation, or community use. Stadiums, field houses, or hockey arenas require much more additional space.

TABLE IX
HIGH SCHOOL OUTDOOR ACTIVITY SPACES

AREA/ACTIVITY	RECOMMENDED DIMENSIONS (IN FEET)	SPACE REQUIRED SQUARE FEET	NUMBER REQUIRED	TOTAL REQUIRED SQUARE FEET	ACRES
MULTIPURPOSE	100 x 120	12,000	2	24,000	0.55
TRACK AND FIELD	320 x 600	192,000	1	192,000	4.41
SHOT PUT	60 x 80	4,800	2	9,600	0.22
DISCUSS	100 x 180	18,000	1	18,000	0.41
FOOTBALL	160 x 360	57,600	2	115,200	2.64
SOCCER	225 x 360	81,000	2	162,000	3.72
SOFTBALL	320 x 320	102,400	4	409,600	9.40
BASEBALL	360 x 360	129,600	2	259,200	5.95
ARCHERY	90 x 225	20,250	2	40,500	0.93
DRIVING RANGE	80 x 750	60,000	1	60,000	1.38
TENNIS	48 x 120	5,760	8	46,080	1.06
GENERAL PURPOSE	100 x 200	20,000	2	40,000	0.92
			TOTAL	1,376,180	31.59

To accommodate additional outdoor activities, many school districts purchase additional acreage off the high school site, taking on additional student safety, transportation, and maintenance issues at a higher cost to the district while causing inconvenience to students, school staff, and parents. Consider "over-building" physical education and athletic spaces to provide adequate spaces over the longer term at a cost savings.

location: away from the academic classroom areas of the school to minimize classroom disruptions, with convenient and direct access to outdoor spaces and a parking lot for loading and transporting equipment. Consider sharing a lobby area with the cafeteria/commons or a performance arts/auditorium area. Provide several hallway approaches to the gymnasium and locker rooms, and separate student and public entrances and parking to ease traffic congestion levels. Plan teacher and coach offices and locker rooms for ease of supervision. Provide for locking off indoor activity spaces from the rest of the school to permit after-hours access by students, community users, and parents with a minimum of security problems. Use wall partitions or nets to separate indoor teaching stations. Plan outdoor activity locations in relationship to their intensity and compatibility of use (e.g. general purpose fields should be nearest the building). Consider the direction of the sun for locating outdoor spectator seating.

learning activities: developing motor skills, physical conditioning, and individual and team skills and interests through physical education and athletic activities. Physical education activities concentrate on developing lifetime fitness, sports, and recreational interests, while athletic activities concentrate on developing specific athletic skills and emphasize individual and team competition. Plan indoor and outdoor spaces and activities for students with disabilities.

learning aids, equipment, technology: provide specifically designed spaces for basketball, volleyball, weights/fitness, wrestling, gymnastics, dance, softball, track and field, soccer, football, etc., as well as the related equipment and supplies for physical education and athletic activities. This includes balls and bats, clubs, shot puts, mats, weights and fitness equipment, racquets, standards, parallel bars, floor plates and anchors, uniforms and protective gear, benches and dugouts, etc., in many sizes and/or adjustable for students at various levels of skill development. Plan for built-in audio and tape equipment in weight and fitness rooms. Provide white/chalkboard, display/bulletin board, first aid and emergency equipment, and portable and permanent public address sound systems. Provide quiet mechanical systems and HVAC systems to increase air exchange in locker rooms, gymnasiums, and other activity stations.

storage, other needs: providing ample storage space for physical education and athletic programs is critical, both for ease of access and security. Plan for storage rooms to be built flush with walls at all teaching stations, and convenient to outdoor activity areas. Provide portable means of hauling and securing equipment, and build off-season storage spaces. Carefully plan flooring, lower and upper walls, ceilings, acoustic treatment, heating and ventilation, and lighting needs for various activities that have different needs. Install recessed equipment such as drinking fountains, telephones, and fire extinguishers whenever possible, and enhance the lobby area with trophy cases. Plan easy road access to outdoor activity sites for students and spectators, especially to stadiums and other varsity contest fields.

Locate toilets and drinking fountains near indoor and outdoor practice and contest areas for student and community member use during off-school hours. Locker room doors should not swing out into crowded corridors. Provide secure and durable locker units of various sizes for both physical education and athletic programs, including visiting teams. Girls' locker room spaces, service areas, and spaces for activities must be equitable in size and quality to boys'. Provide work and office space for teachers and coaches to prepare and store materials, and access a phone, computer with Internet access, and a printer and copy machine. Plan access to spaces for adults with disabilities.

The publication Accessible Outdoor Recreation Areas provides guidelines on routes of travel, surfacing materials, play field access, equipment, etc., pending final passage of design guidelines. School districts planning swimming pools need to consult the Minnesota Department of Health regarding requirements for swimming pools.

Sources:

<i>PUBLICATION</i>	<i>AVAILABLE FROM</i>
<i>FACILITY PLANNING FOR PHYSICAL EDUCATION, RECREATION, AND ATHLETICS</i>	<i>AMERICAN ALLIANCE FOR HEALTH, PHYSICAL EDUCATION, RECREATION AND DANCE, 1993</i>
<i>BEYOND THE FIELD HOUSE</i>	<i>SCHOOL PLANNING & MANAGEMENT, SEPTEMBER, 1996</i>
<i>ACCESSIBLE OUTDOOR RECREATION AREAS MANUAL 1997/1998</i>	<i>DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1998</i>

Part 3.08 Guidelines for School Support Spaces

School support spaces include reception, work, conference, office, storage, and related spaces for administration (including the school nurse), guidance and student services, teacher and staff, food service, and the building systems and maintenance areas. This part also includes a discussion of auditoriums, as most school districts will consider constructing an auditorium in at least one school within the district.

School support spaces often take a back seat in school facility planning sessions or are subject to school construction project budget reductions; consequently, schools are typically short of support spaces, often severely. Schools are increasingly providing many additional programs and services before, during, and after school hours (see Part 2.05) and need program and support spaces to do so. A shortage of support office, storage, and conference room spaces hampers teachers and school support staff in the performance of their duties, and reduces services to students, staff, and parents.

It is therefore highly desirable to plan for additional support spaces that current or future school programs and services will need (e.g. child care and parenting), and to make an extra effort to see that support spaces are not cut from school project budgets. School support spaces are most always a part of subsequent building addition and renovation projects.

(a) School Support Spaces Square Footage Guidelines

TABLE X
SCHOOL SUPPORT SPACE SQUARE FOOTAGE GUIDELINES

SCHOOL SUPPORT SPACES	ELEMENTARY	MIDDLE LEVEL	HIGH SCHOOL
ADMINISTRATION / HEALTH SERVICES	SF	SF	SF
RECEPTION / WAITING	200 - 250	250 - 300	250 - 400
PRINCIPAL, ASSISTANT PRINCIPAL	150 - 200	150 - 200	150 - 200
SECRETARIAL WORK STATION	80 - 100	100 - 125	100 - 150
WORK ROOM & MAIL AREA	300	350	350 - 400
CONFERENCE ROOMS, SMALL / LARGE	150 - 200 / 250 - 400	150 - 200 / 250 - 400	150 - 200 / 250 - 400
IN-SCHOOL SUSPENSION	NA	200	200 - 400
OTHER OFFICES	100 - 150	100 - 150	100 - 150
TOILETS	120 - 180	120 - 180	120 - 180
SCHEDULING, COMPUTER SERVICES	150 - 250	150 - 250	150 - 250
SCHOOL NURSE / HEALTH SERVICES	400 - 600	500 - 700	600 - 800
GUIDANCE/STUDENT SERVICES			
RECEPTION / WAITING	NA	150 - 200	150 - 200
GUIDANCE OFFICE	150	150	150
SECRETARIAL WORK STATION		80 - 100	80 - 100
CONFERENCE ROOM	150 - 200	200	200
PSYCHOLOGIST, SOCIAL WORKER OFFICE	100 - 150	100 - 150	100 - 150
CAREER CENTER	NA	150	400 - 1000
TESTING	100	100	100
RECORDS, SUPPLY, STORAGE	200	250	250 - 300
STUDENT STORE / ACTIVITIES	NA	250 - 400	400 - 700
TEACHER / STAFF			
PLANNING WORK STATIONS	50 SF / STAFF	50 SF / STAFF	50 SF / STAFF
OFFICES	100 - 150	100 - 150	100 - 150
CONFERENCE, KITCHENETTE, STORAGE, PRINT, COPY	10 - 20 SF / STAFF	10 - 20 SF / STAFF	10 - 20 SF / STAFF
TOILETS	120 - 180	120 - 180	120 - 180
FOOD SERVICE	SF VARIES GREATLY BASED	ON TYPE AND QUANTITY OF	MEALS SERVED
CAFETERIA DINING SPACE	12 TO 13 SF/ STUDENT	13 TO 15 SF/ STUDENT	14 TO 16 SF/ STUDENT
STAFF DINING AREA	15 SF / STAFF DINING	15 SF / STAFF DINING	15 SF / STAFF DINING
FULL PREPARATION KITCHEN	1000 - 2000	1500 - 2500	2000 - 3000
SERVING ONLY KITCHEN	500 - 1000	750 - 1225	1000 - 1500
SERVING LINE	800	1000 - 1500	1500 - 2000
DRY FOOD STORAGE	300	350	350 - 450
COOLER	250	300	300 - 400
FREEZER	350	350	350 - 450
DISHWASHER	300	350 - 400	400 - 600
OFFICE	150	150	150
LOCKER ROOMS, TOILET	120	150	150 - 200
RECEIVING AND HOLDING	300	300 - 400	350 - 450

SCHOOL SUPPORT SPACES			
AUDITORIUM	SMALL - 250 PERSONS	MEDIUM - 500 PERSONS	LARGE - 750 PERSONS
SEATING	2500	5500	8250
STAGE	2200	3000	3500
DRESSING ROOMS	400	500	600
MAKE-UP ROOM	200	250	300
TOILETS WITH SHOWER	128	128	180
COSTUME STORAGE	150	225	300
SCENE SHOP	800	1000	1200
LOBBY	500	1000	1300
TOILETS IN LOBBY AREA	492	600	672
CONTROL ROOM	200	240	240
DIMMER ROOM	120	150	150
CATWALKS	600	700 - 1000	700 - 1400
LOADING BRIDGE	150	150	150
PIANO STORAGE	80	80	80
OTHER OPTIONS - SEE PART 3.08 (G)			
	ELEMENTARY	MIDDLE LEVEL	HIGH SCHOOL
BUILDING SYSTEMS, MAINTENANCE	SF	SF	SF
CUSTODIAL	400 - 600	500 - 700	600 - 800
CUSTODIAL CLOSETS	40	40	40
TOILETS	2.5% x NET SF	2.5% x NET SF	2.5% x NET SF
GENERAL STORAGE	3% x NET SF	3% x NET SF	3.5% x NET SF
MECHANICAL/ELECTRICAL INTERIOR SYSTEMS	7.5 - 8.5% x NET SF	7.5 - 8.5% x NET SF	7.5 - 8.5% x NET SF
CIRCULATION AND STRUCTURE	30 - 40% x NET SF	35 - 45% x NET SF	35 - 45% x NET SF

(b) Administration/Health Services

Provide an accessible, customer-friendly administration and school nurse/health services office area to help set a positive tone for students and visitors to a school. Essential elements to consider for administration and health services spaces include:

square footage: 1840-4790 square feet depending upon school level, size, and staffing levels (see Table X above). Determine current and projected staffing levels to identify the needed spaces. The school nurse/health services room should be at least 650 square feet with an accessible toilet of at least 130 square feet. For vision screening, 22 feet is needed. Provide additional square footage as community health services are added.

location: locate administration offices near the main entrance and/or student commons for ease of access by students, staff, and parents and visitors. Plan for the ease of traffic flow in and through the office area for students, staff, and parents and visitors. Provide for the visibility of bus loading and student commons areas from the administration office area.

In larger schools with student houses or wings, consider locating an assistant principal's office in those areas to personalize student services. However, do not forget to provide for support staff assistance to administrative staff and coverage for absent support staff when planning such a decentralized office location. Plan for a separate entrance and reception area for school district administration offices that are located within a school.

Provide a separate entrance for the school nurse/health services room for ready access by paramedics, and to quickly transport students and equipment in and out of the building. Plan for the school nurse/health services room to have doors leading to the hallway, the administration and student services areas, and the chemical health specialist or other health related program.

activities, equipment, storage, other needs: multiple entrances/exits to ease traffic flow in and out of the administration office, and a service counter to separate visitor from work and office spaces are important. Consider providing a school business window open to the corridor to sell lunch and school event tickets. Plan to soundproof inner offices for administrative staff, and provide portable walls to accommodate flexible locations for offices and work spaces.

Utilize the school nurse/health services room for the health care of students, health screening, and for storing student health records. Plan for a waiting area with chairs and a telephone, examination space with scales, table(s), an observable rest area with cots (one per 300 students with curtains on tracks), an isolation cot room, toilet(s), sink, and mirror, and secured storage spaces and a small refrigerator for medial supplies and prescriptions. Provide work and office space for a nurse or health specialist to prepare and store health materials, and access a phone, fax machine, computer with Internet access, and a printer and copy machine.

(c) Guidance/Student Services

Providing undersized guidance/student services spaces creates major problems for guidance and student services staff, student and parent access, traffic control, and the delivery of student services. Essential elements to consider for guidance/student services spaces include:

square footage: 1000-4400 square feet depending upon the school level, size, and staffing levels. Determine current and projected staffing levels to identify the additional spaces needed for staff such as social workers, psychologists, audiologists, work-study coordinators, and others.

location: within or near the administration area. Consider locating a guidance counselor's office in a student house or classroom wing. Do not forget to plan for support staff assistance to counseling staff and coverage for absent support staff. Plan to locate the career information center within or near the guidance/student services area or the library/media center.

activities, equipment, storage, other needs: plan flexible and expandable spaces to accommodate changing program and staffing needs. Provide at least one conference room large enough for 8-10 students. Acoustically treat offices to assure privacy, and provide a locking file cabinet for guidance counselors. Provide a secure, accessible storage area for student records. Plan for accessibility to the area by students or parents with a disability. Provide for ample display/bulletin board space within and adjacent to the guidance and student services office area.

Plan for several small multipurpose rooms for student government, debate, newspaper, yearbook, and other purposes. Consider providing a general conference room separate from the administration and guidance and student services areas to provide space for department meetings and teacher-student-parent conferences. Provide work and office space for guidance counselors to meet with students and parents, prepare and store materials, and access a phone, computer with Internet access, and a printer and copy machine.

(d) Teacher/Staff

Essential elements to consider for teacher/staff spaces include:

square footage: 50 square feet for a planning workstation, and 100-150 square feet for an office or for other spaces for intermittent staff, teacher aides, and volunteers. Plan for 10-20 square feet per teacher and staff member for conference, kitchenette, storage, and printing and copying spaces. Provide for and assure privacy for toilets of at least 120-180 square feet each for men and women adjacent to the staff dining/break room.

location: central for accessibility of all staff, or near houses, departments, or program areas as appropriate. Provide groups of teachers common or shared planning work stations or office spaces to improve staff communications, team planning, and the use of resource materials. An all-staff dining/break room needs to be large enough to provide seating for 20-25% of the staff, and have adequate power for appliances.

activities, equipment, storage, other needs: provide planning workstation and office spaces for teachers and staff to plan and prepare teaching materials, store equipment and materials, and access a phone, computer with Internet access, and a printer and copy machine. Plan for the adequate ventilation of teacher and staff office areas.

(e) Food Service

The food service area includes spaces for dining, food preparation, serving, storage, dishwashing, staff, and receiving and holding. Essential elements to consider for food service spaces include:

square footage: provide 3070-7700+ square feet for a kitchen, serving line, storage, office, receiving and holding, and other spaces, in addition to student and staff dining spaces. Providing spaces for food preparation, meal service, and dining varies greatly depending upon the type of food service system, the number of menus, serving lines, and lunch periods, table and seating arrangements, and the ages and number of students served in each lunch period.

<u>Function/Activity</u>	<u>Space Needed</u>
Cafeteria Dining Space.....	12-16 sq. ft./student
Staff Dining Area	15 sq. ft./person
Full Preparation Kitchen	1000-3000 sq. ft.
Serving Kitchen Only.....	500-1500 sq. ft.
Serving Line	800-2000 sq. ft.
Dry Food Storage	300-450 sq. ft.
Cooler	250-400 sq. ft.
Freezer	350-450 sq. ft.
Dishwasher	300-600 sq. ft.
Office.....	150 sq. ft.
Locker Rooms, Toilet.....	120-200 sq. ft.
Receiving and Holding.....	300-450 sq. ft.

location: near an outside delivery platform to easily move food and supplies to the inside receiving and holding area, through storage to the kitchen preparation areas, and finally to the serving area. Special consideration needs to be given to the layout of equipment, serving line(s) and the location of the dishwasher. Plan student traffic lanes in and out of the serving and dining areas to avoid cross traffic and allow for an orderly end to the serving lines. Locate the dishwashing area in a separate room close or adjacent to the kitchen, near an exit from the dining area, and accessible without crossing incoming traffic. Provide dining space for students who bring their own lunch, and serving and dining facilities for students with disabilities.

activities, equipment, storage, other needs: plan a dining area that is attractive, brightly colored, cheerful, non-institutional in atmosphere, interesting, and preferably with windows to establish a pleasant eating environment. Utilize dining space for a student commons, large group instruction, study hall, or community meetings.

Refer to the latest U.S. Department of Agriculture Equipment Guide for On-Site School Kitchens for recommendations on the kind and size of equipment needed. The Minnesota Department of Health provides guidelines on sanitation, cleaning, water supply, disposal, floors, walls, ceilings, lighting and ventilation in their Rules for Food and Beverage Establishments. Involve food service staff who will use the facility throughout the planning process. Consider employing professional consultants who work with school kitchen design and layouts.

Sources:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>EQUIPMENT GUIDE FOR ON-SITE SCHOOL KITCHENS</i>	<i>U.S. DEPARTMENT OF AGRICULTURE</i>
<i>RULES FOR FOOD AND BEVERAGE ESTABLISHMENTS</i>	<i>MINNESOTA DEPARTMENT OF HEALTH</i>

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(f) Auditorium

Early in the planning process, a school district needs to decide whether to design an auditorium space specifically for music or theater performances, or for multipurpose uses. Auditoriums typically provide space for many school and community events, suggesting that a multipurpose auditorium is suitable for most school districts. Essential elements to consider for auditoriums include:

square footage: 8220-17787+ square feet for an auditorium seating 250-750 persons, not including optional features listed below. Each type of auditorium has specific size shape, and outfitting requirements. Larger auditoriums need more and larger spaces than smaller auditoriums. Refer to Table VIII School Support Space Square Footage Guidelines for specifications for a small, medium and large auditorium. An auditorium should provide space for most of the following functions/ activities:

<u>Function/Activity</u>	<u>Space Needed</u>
Seating	10-11 sq. ft./seat
Stage, 20-50 feet deep	2200-3500 sq. ft
Dressing Rooms	200-300 sq. ft./DR
Make-up Room.....	200-300 sq. ft.
Toilets with Shower.....	64-90 sq. ft./T
Costume Storage.....	150-300 sq. ft.
Scene Shop	800-1200 sq. ft.
Lobby	1.5-2.5 sq. ft./seat
Toilets in Lobby	492-672 sq. ft.
Control Room	200-240 sq. ft
Dimmer Room	120-150 sq. ft.
Catwalks	600-1400 sq. ft.
Loading Bridge.....	150 sq. ft.
Piano Storage.....	80 sq. ft.
Green Room (optional).....	150-250 sq. ft.
Grid Iron (optional)	+/-3/4 stage area
Camera Ports (optional).....	50 sq. ft. per port
Orchestra Pit (optional)	400-700 sq. ft.
Coat Room (optional).....	80-150 sq. ft.
Sound Tower Storage (optional)	150 sq. ft.
Ticket Office (optional).....	80-160 sq. ft.
Concessions (optional)	200-250 sq. ft.

location: in a separate wing of the school to minimize adverse sound transmissions to other school areas. An entrance to the stage portion of the auditorium should be near the music and drama/theater classrooms. The lobby should not be near the stage entrance for proper performer/audience visual and acoustic separation. Consider sharing auditorium lobby/commons space with the gymnasium and cafeteria; however, crowd and noise control from concurrent events need careful attention, as do building code requirements for lobby intermission activities. The auditorium should have ready access to an entrance for rapid exiting of parents and visitors, and special attention must be given to providing adequate parking and access roads for easing traffic.

learning activities: in addition to musical or dramatic performance activities, students will engage in auditorium and performance management activities, including theatrical lighting, sound system, rigging design and execution, scenery design and construction, recording, and directing. Consider providing smaller areas (e.g. seating for 75-150) for teacher or school large group presentations, or for community use. Students may also participate in and learn from other school and community group programs and performances.

learning aids, equipment, technology: design considerations determine what learning aids, equipment and technology are needed in an auditorium. These design considerations include: the auditorium shape, stage type, floor slope, fly, proscenium proportions, rigging, curtains, acoustical equipment and layout, catwalks, loading bridge (assists the rigging system for raising scenery), box booms, theatrical lighting, dimming equipment and capabilities, fire safety, control room, sound system, camera ports, special needs student/adult accessibility to seating and stage, noise criterion, heating, ventilation, and air conditioning, sound isolation, video projection, and video production.

storage, other needs: the design of the auditorium, i.e., its shape, stage type, floor slope, rigging, curtains, rigging, lighting, etc., will determine storage and other needs. For example, providing a wide space is desirable for dramatic performances and a narrow space is desirable for musical performances. A multipurpose auditorium is normally a hybrid of the two designs. Common stage types are proscenium, thrust, theater-in-the-round and arena. The proscenium stage is very common. Consider the specific advantages and disadvantages of each stage type.

Consult with an architect who specializes in design consideration options early on in the planning process to help determine design specifications, equipment, technology, storage, and other costs.

(g) Building Systems, Maintenance, Storage

Providing a smoothly operating and well-maintained school improves the learning environment and creates a more welcoming tone for students, staff, parents, and visitors. It is much more difficult to create such an environment without adequate spaces for mechanical and electrical equipment and custodial services. Involve school district maintenance and school custodial staff with engineers and architects in determining what spaces are needed. Essential elements to consider for building systems, maintenance, and storage spaces include:

square footage: 400-800 square feet for a custodial workshop, office, and storage space, and 40 square feet per custodial closet. Plan for 2.5% of the net square feet of the school for toilets, 3-3.5% for general storage, 7.5-8.5% for mechanical/ electrical interior systems, and 30-45% for circulation and structure. A student commons area, auditorium, pool, and lobby spaces require additional square footage.

location: provide for one or more custodial closets, complete with service sinks, on each floor or for each wing of the school. Locate the custodial workshop, office, and storage space(s) near an outside shipping/receiving area with a loading platform. Provide closets, receiving and storage spaces, and toilets near areas requiring special maintenance, equipment, and supplies, such as the cafeteria, gym, pool, auditorium, or industrial technology. Plan a separate storage space for flammable supplies away from student traffic areas. Consider locating student lockers in one or more locker bays or in hallways throughout the building.

activities, equipment, storage, other needs: providing storage spaces for outdoor maintenance equipment such as mowers, snow removal equipment, ladders, and other tools and equipment is essential. Storage areas for equipment and fuel must comply with fire code regulations. School bus garages require the design services of a registered architect or engineer and must conform to all building code requirements.

Part 3.09 Guidelines for Community Use/Partnership Spaces

(a) Community Education

Community education includes early childhood family education, child care, adult basic education, and other programs for children, youth, and adults based upon community member and school district requests.

Adult Basic Education Spaces

Many school sites provide spaces to accommodate day and/or evening classes in Adult Basic Education (ABE). These programs include Adult Diploma, English as a Second Language, Family Literacy, GED, and basic skill brush-up classes. Essential elements to consider for ABE program school facility spaces include:

- classroom space with adult-size chairs and desks. Portable walls/dividers are desirable to facilitate small group learning;
- computer work stations and computer labs with adult-size chairs and tables;
- space/rooms for pre-school aged child care and family literacy; and
- small, private spaces for one-to-one tutoring, learner assessment activities, and counseling.

(b) School-Age Child Care

An increasing number of school districts are offering School-Age Child Care (SAC) or Extended Day for children and youth from kindergarten through age 14 as part of their community education program. The overall purpose of such programs is to expand students' learning opportunities during their out-of-school time. One out of eight school-aged children in Minnesota are left alone during their out-of-school time. Welfare reform is also increasing the need for accessible, high quality child care, including school age care. Most participating school districts provide after school programs, others before and after school, and more than half school release day, summer, and vacation day programs. Many districts offer either ½ day or every other day SAC programs for kindergartners. Participating children and youth in SAC programs can spend more time in the SAC environments than they do in the classroom or at home.

Schools can be rich environments for SAC programs, children, youth, and families. Quality SAC programs provide a wide range of children with multiple levels of abilities, needs, and interests with accessible indoor and outdoor environments that meet the needs of their age group. SAC programs are "gateways" to schools, and can be integrated with activities involving families and community groups.

It is important to provide SAC programs dedicated space(s) for program activities, in addition to integrating activities and sharing school spaces with other programs. Plan for providing spaces for SAC activities, including classroom, storage, computer lab, gymnasium, art and music, media center, cafeteria, and outdoor spaces with age appropriate equipment. Provide square footage to meet the needs of the age group and the number of children or youth served. See elementary school space descriptions under Part 3.05 (e.g. Early Childhood, Kindergarten, etc.) for square footage guidelines and essential elements for each space.

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>124D.19</i>	<i>11</i>
<i>124D.22</i>	<i>1-4</i>

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(c) Public/School Library

School-community partnerships enhance school and community resources and services. Public/school libraries sharing services are one such potential partnership. Developing a jointly operated library requires the full participation of school, public library, and city/county representatives, as well as citizens.

M.S. 134.195 provides for a school district and a city to jointly operate and finance a public library, subject to approval by the governing school and public library board. Subdivision 10 establishes criteria for public library services operated under such a joint agreement, including the following:

- the public library shall be centrally located in the community;
- a separate entrance, accessible from the outside of the school building, shall be provided for persons using the public library;
- the public library shall be available for users during school hours and during at least 15 additional evening and Saturday hours;
- public library services, materials, programs, and equipment shall be available for simultaneous use by students and public library users;
- the public library shall have a separate telephone service;
- parking, restrooms, water fountains, and other necessities shall be easily accessible to public library users; and
- a media supervisor licensed by the board of teaching may be the director of the public library.

Special design considerations are required in part to ensure the safety of school children in proximity to public library users, and to provide adequate services for public library users. These considerations include:

LOCATION, ENTRANCE, AND ADJACENT AREAS

- provide a distinguishable building façade and exterior signage that clearly state that a public library exists within the school;
- design the required separate entrance to the public library to eliminate the possibility of an unauthorized person gaining access to students in or near their classrooms;
- designate a public library parking area separate from student and staff parking areas;
- provide lighted parking and sidewalk areas for the safety of public library users during evening hours;
- comply with local and State regulations concerning emergency exits and evacuation signage;

- locate the public library on the ground floor accessible to those with special needs;
- provide signage which clearly indicates where the public can and cannot go; and
- provide restrooms and water fountains that can be used by public library users without entering student portions of the school.

PUBLIC LIBRARY AREAS

- design a highly open, visible public library area to quickly provide assistance to users and to minimize staffing;
- provide a large reference desk to permit the school and/or public librarian to work;
- provide a variety of seat, table heights, and shelving to accommodate children, adults and special needs users (including pre-school and home-school students);
- provide a public user area for research/reading without disturbance by student users;
- provide enough library equipment for student and public users, especially for computers accessing library resources, databases, or on-line and Internet services;
- provide a meeting room (not a classroom) for pre-school children's story-times during school hours and for after-school children, adult, and community programs;
- provide a separate space for the delivery of public library materials;
- provide separate public and school library office, work, break, and storage areas;
- consider shelving public library materials for children and young adults with school materials; and
- provide separate air conditioning and heating units or access to the equipment by public library staff.

A manual developed by Library Development and Services provides guidance to schools districts and communities in analyzing the desirability of a joint public/school library partnership. Consult the "Guidelines for Determining Space Needs..." to learn of the detailed specifications on public library space needs. To obtain either document, or to ask any questions on joint school/public libraries, please contact:

Library Development and Services
Department of Children, Families & Learning
1500 Highway 36 West
Roseville, MN 55113
(651) 582-8722

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>134.195</i>	
<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>GUIDELINES FOR DETERMINING SPACE NEEDS, AS EXCERPTED FROM STANDARDS FOR MINNESOTA PUBLIC LIBRARIES</i>	<i>LIBRARY DEVELOPMENT AND SERVICES, 1996</i>

SECTION IV. RELATED ISSUES, CONSIDERATIONS

This section will highlight key school facilities issues as described by school facilities planners and architects.

Part 4.01 Developing Partnerships with Community Groups, Public Agencies, and Private Users

"School-community partnerships" has long been a viable concept for school districts and communities. In urban and rural areas, the school has traditionally been a vital and central part of neighborhood and community life. Schools have become more receptive to using school spaces to provide additional programs and services for students, adults, and community members and organizations. These programs and services include preschool and after-school classes, social services such as day care and counseling, health services, adult education, community sports and recreation, community cultural and art exhibitions, senior citizen activities, and civic and private organization meetings.

School-community partnerships may also include formal contract use agreements with community groups, public agencies, and private organizations. Developing such partnerships is in the long-term best interest of school districts and communities alike. Community use of school facilities enables more cost-effective use of public resources, and builds stronger bonds between schools and communities.

For example, under M.S. 122.8355, Family Services Collaboratives, school districts may partner with a county, public health organization, community action or Head Start program, and other community service providers to provide accessible, cost-effective, and integrated services for local families and children. Through joint powers agreements and interagency agreements, schools can be the hub for service planning and delivery.

To successfully develop partnerships, consider including the following components:

- ◆ Joint facility, program, and operations planning;
- ◆ Joint ownership and operational agreements;
- ◆ Joint funding from multiple sources;
- ◆ Clearly defining goals, roles, clientele, coordination needs, and communication channels;
- ◆ Sharing information about and meeting with school and partnership program staff;
- ◆ Separating partnership program budgets and review by all partners, if applicable; and
- ◆ Setting up an advisory council of participating community groups, public agencies, and private users.

Designing school facilities to increase community use should include the following features:

- ◆ A large, mall-like building easily modifiable to accommodate program and partnership changes;
- ◆ Separate, private areas to house partnership programs and services with multiple secure entrances;
- ◆ Ample office, conference, classroom, and storage spaces which can be easily re-sized;
- ◆ Central mechanical system control and surveillance; and
- ◆ A sophisticated security system.

Sources:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>COMMUNITY CENTER SCHOOLS FOR TODAY</i>	<i>RINGERS, JOE CEFPI'S, EDUCATIONAL FACILITY PLANNER, 1996</i>
<i>ESTABLISHING A SCHOOL- COMMUNITY AGENCY COLLABORATION</i>	<i>NASSP PRACTICIONER, 1992</i>
<i>MINNESOTA STATUTE 122.8355</i>	<i>SUBDIVISION</i>

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Part 4.02 Urban and Rural School Issues

URBAN SCHOOL ISSUES

Urban schools present challenges to those persons responsible for the education of students. Although these challenges are found in all school districts, their scope and intensity are usually greater in urban areas, and especially strong in the largest, most populous cities. Some of these issues include:

- ♦ Demographics: ethnic, cultural and economic diversity presents opportunities as well as challenges in urban areas. As a result of employment opportunities, transportation, level of income, etc., low-income persons tend to concentrate in the largest city urban areas. Immigration and emigration of large groups of students, often from a single country, usually settle in larger cities, creating school capacity concerns.
- ♦ Student Profile: students in the urban areas have a much higher mobility rate both within and between school districts. Mobility or turnover rates of students can be as high as 70% for an individual school. Language is a huge issue in the urban areas, with as many as 70 different languages spoken by students in a school district. There can be high concentrations of students with special needs. Limited English proficiency and special education classrooms and support spaces are necessary, in addition to regular classrooms and support spaces.
- ♦ School Sites: one of the greatest challenges to urban school districts is the acquisition or expansion of school sites. The cost of urban land is very high, and the costs of moving, resettlement, and demolition can double the purchase price. Buying homes and forcing residents to move (e.g. 30 homes per 3 1/2 acre block) has a high social impact. The need to remove hazardous materials from the site is increasingly common, and is costly. Land for physical education and athletic activities is difficult to acquire, most often must be shared by multiple school and community users, and thus the sites tend to become overused as well as difficult and expensive to maintain.

While a large school site may be more common in suburban or rural schools, urban schools must be built on compact sites. Limited school sites require that school facilities must be multi-storied, and each square foot of both land and buildings serve multiple uses and users. In urban areas, zoning restrictions, building codes, and other municipal requirements also tend to be more restrictive, and can add greatly to the cost of constructing schools. Indoor air quality, noise pollution, and the security of students and adults using the school are now requiring more attention.

- ◆ Others: factors closely related to the demographics and the nature of urban areas also add greatly to the complexity of school planning. There are often communities within communities, usually reflecting different ethnic, cultural, and/or religious backgrounds. The multiplicity of government agencies (e.g. HUD, Park Board, Planning Commission), social agencies (e.g. Health, Welfare), and charitable organizations adds another layer of complexity to planning efforts. Due to the aging of the housing stock in large areas of the cities, redevelopment projects are common, bringing with them a myriad of problems for the schools.

Dealing with issues in the planning, design and construction of schools in urban areas requires much effort, imagination, skill, and dedication.

RURAL SCHOOL ISSUES

Rural schools have and will continue to be an integral part of the life of the communities they serve. Rural schools can be a source of information and a focus of efforts to promote and support local entrepreneurial and community development activities, and help make rural communities more sustainable.

Rural schools have unique facility needs. Elementary and secondary students share schools and support services, yet need separate classroom areas. Most rural schools act as the center of the community, and community organizations frequently request civic and social uses of the schools, resulting in the sharing of auditoriums, cafeteria/commons, gymnasiums, the media center, and outdoor activity areas.

Many smaller rural schools do not have auditoriums, so they must rely on gymnasiums with or without a stage area for large group presentations and performances. Planning for multiple uses for general and specialized classrooms as well as support areas is necessary, while retaining the separation of age groups as much as possible.

With the advent of low voltage connectivity, small schools are in a strong position to upgrade technology to better service students, staff, and community users. The small K-12 school "library" now has access to an endless amount of data via low voltage resources and the Internet, a window to the world of information.

Rural schools need to review the full scope of school facility concerns and continue to use their schools to improve the education of students and service to communities.

Part 4.03 Security Concerns

The majority of elementary and secondary schools in the United States were not designed with security measures in mind. Many school designs are unintentionally disastrous in terms of professional security standards. Poor visibility, inadequate communications, excessive access points, varying levels of lighting, limited intrusion detection systems, nonexistent key control, inconsistent or inaccurate inventory control, and inoperable or nonexistent locks characterize some security problems.

This part will provide an overview of school security considerations and highlight issues in the areas of physical security, access control, and communications. Security measures will make a school site less vulnerable to damage, help prevent and respond to property loss, and provide physical protection systems. **All applicable federal, state and local health and safety codes must be met in designing security measures for a school facility.**

PHYSICAL SECURITY

Measures to make a school less susceptible to being a target include:

- ◆ Locate the school where it is visible from neighboring homes and businesses;
- ◆ Make entries, loading docks and administrative offices visible from the street;
- ◆ Provide vehicle access around buildings to permit night surveillance and access by emergency vehicles and fire equipment;
- ◆ Limit access to upper floors or roof by placing dumpsters or other things onto which a person can climb or grasp away from the building;
- ◆ Install exterior lights with break-resistant lenses or mesh covers to illuminate the building exterior and surrounding grounds; and
- ◆ Remove exterior door handles from all but main doors to deny entrance to intruders.

Parking and playground area security measures include:

- ◆ Design parking lots in small units to decrease property damage, and discourage through traffic cruising and use speed bumps to reduce traffic speed;
- ◆ Provide entries and exits with strong, lockable gates;
- ◆ Locate parking lots and playgrounds where easy and direct visual observation is possible;
- ◆ Plan fenced playgrounds with separate activity areas. Keep vehicle traffic out of sports and play areas and block their entry to other unauthorized areas; and
- ◆ Anchor trash cans to holders or anchor posts to prevent overturning or theft.

Landscaping security measures include:

- ◆ Place trees at least 10 feet from buildings to prevent window and roof access;
- ◆ Plant mature shrubs in large masses, making them less attractive to abuse;
- ◆ Use high perimeter chain-link fencing and gates near school to permit visibility; and
- ◆ Either implement a nighttime total darkness policy or increase campus lighting to fully illuminate all areas, especially near potential points of access to the building.

Building security measures include:

- ◆ Design walls to prevent roof access;
- ◆ Install exterior fixtures flush or recessed to eliminate handholds for climbing;
- ◆ Provide welded metal lockers for middle and high school students
- ◆ Make roofs of fire-resistant or fire-retardant material;
- ◆ Design walls, stairwells and corridors for high visibility; and
- ◆ Avoid suspended tile ceilings, which are easily vandalized and often used to hide weapons, drugs and other items.

ACCESS CONTROL

Most schools have far too many access points. Not only do they have many doors, but also in many schools most of these doors are left unlocked and accessible from the outside. Measures for access control include:

- ◆ Install magnetic or electronically controlled locking system for all doors;
- ◆ Designate one visitor entrance, monitor school entrances, and use an I.D. card system;
- ◆ Limit building access and eliminate unnecessary doorways and handles and locks on the outside of exterior doors used primarily as exits;
- ◆ Install doors with security features, and install fire doors in necessary locations;
- ◆ Consider the location, size and necessity of windows;
- ◆ Avoid placing windows on the ground floor, if possible, near outside play or gathering areas, and install break-proof windows;
- ◆ In lavatories use alternatives to plate-glass mirrors, and avoid using windows for ventilation. Install solid plastic toilet partitions. Conceal as much lavatory piping as possible, and use concealed automatic flush valves; and
- ◆ Lock and secure building areas and specific spaces such as cafeterias/multipurpose rooms, administrative offices, safes and vaults, science laboratories, music rooms, shop, arts/crafts rooms, student store/supply rooms, library/media centers, gyms, locker rooms, and service areas.

COMMUNICATIONS

Many schools have antiquated communication systems. Measures to increase security include:

- ◆ Enable teachers contact the office through in-house phones or by use of a panic button in the classroom;
- ◆ Use the public address system to broadcast emergency messages throughout the school, and have two-way public address system so that classrooms can be monitored on the same system;
- ◆ Do not install pay phones in the hallways or on school grounds to reduce loitering, rumor control, false 911 calls, and related misuse; and
- ◆ Purchase cellular phones, two-way, portable walkie-talkies, and/or radio units for use in routine and emergency situations.

The Crime Prevention Through Environmental Design (CEPTD) is a national program that offers substantial suggestions on the design of schools from a security and safety standpoint. For further information please contact:

Crime Prevention Specialist
Community Crime Prevention/SAFE
217 South Third Street
Minneapolis, MN 55401-2139
(612) 673-3015

Part 4.04 Indoor Air Quality

The issue of whether poor indoor air quality in schools causes medical problems is still being hotly debated. Published reports link conditions found in schools affecting indoor air quality with such symptoms as headache, nausea, congestion, drowsiness, dizziness, and general respiratory distress. These school conditions include improperly designed or constructed buildings, moisture penetration, inadequate (or intentionally altered) heating, ventilation, and air conditioning systems, expanded usage of synthetic fibrous materials and chemicals (pesticides, cleaning materials, school supplies, perfumes on people), inappropriately-used spaces, and overcrowded schools.

For the vast majority of people, the effect of poor indoor air quality may result in a runny nose, watery eyes, headaches, and fatigue, which usually disappear after a person leaves the building. People vary in their sensitivity to different substances and concentration levels. Including asthmatics (5% nationwide) and persons with allergies and other sensitivities, the estimate of persons affected could reach 15% or more of the population. Assuming a potential at-risk population of about 10%, the potential at-risk student population "could" (not necessarily "would") exceed 80,000 in Minnesota. Teachers, staff, visitors, and parents in schools would also be at-risk. As more time is spent inside of Minnesota schools because of the weather, there is an increased likelihood of affecting persons by poor indoor air quality.

How did the indoor air quality issue develop? In the 1970s and 1980s, the design standard for the amount of outside fresh air that should enter occupied spaces was significantly lower (5cfm/person) than today's standard. As a part of the push for energy savings during the oil crisis years, school buildings were made tighter. Sealing leaks and openings to the outside, not providing windows or making windows inoperable, and recirculating air above dropped ceilings was not at all uncommon. Recirculating air rather than continuously bringing in fresh, outside air, reduced school heating and cooling costs. As these systems deteriorated, the total volume of air and the percentage of outside fresh air circulated to classrooms and school spaces was further reduced over time.

What does the level of carbon dioxide tell us about indoor air quality? An elevated level of carbon dioxide indicates that the air is recirculating too many times or that the supply of outside fresh air is inadequate for the number of persons in a room. A lack of adequate outside fresh air is the recognized way of determining if other low-level chemicals, even though present at safe levels, are building up to the point where they are a problem for asthmatic persons or persons with allergies.

The emphasis should be on making sure that adequate amounts of outside fresh air reach each person in an occupied space. The true measure of adequate amounts of air is the number of outside fresh air cubic feet per minute entering the occupied space. **Since 1994, the standard is 15 cubic feet per minute per person of outside air entering each occupied space. Schools renovating existing heating, ventilation, and air conditioning systems or installing new systems must meet today's higher standard.**

If parents believe that a school building is in some manner affecting their child's health, they are generally tenacious in their efforts for answers and a satisfactory resolution of the issue. Thus, it is prudent for school districts to prepare to deal with indoor air quality issues. School districts must adopt an Indoor Air Quality Management Plan, monitor, and where needed, improve indoor air quality. School districts must include an Indoor Air Quality component in their Health and Safety Management Plan. School districts should focus on evident problems like inadequate ventilation or hazardous materials or, if a general problem exists, do an evaluation to determine the nature and source(s) of the problem such as the following:

- ◆ buildup of formaldehyde and volatile organic chemicals due to inadequate air exchanges;
- ◆ mold and byproducts due to water entering the building;
- ◆ dust mites and byproducts due to carpet not being vacuumed at least once a week; and
- ◆ chemical mists and fumes due to inadequate local exhaust ventilation in art, science, shop, kitchen, and/or maintenance areas.

Applicable government rules and industry standards apply as appropriate. Testing of suspected problem areas using these standards may be necessary. Indoor air quality is identified as a hazard requiring management and is eligible for Health and Safety funding under M.S. 123B.57. Please see Part 1.02 (h) Health and Safety for further information.

Sources:

<i>MINNESOTA STATUTES</i>	<i>SUBDIVISIONS</i>
<i>123B.57</i>	
<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>INDOOR AIR QUALITY OPERATIONS AND MAINTENANCE MANUAL</i>	<i>DEPARTMENT OF CHILDREN, FAMILIES & LEARNING, 1998</i>

Part 4.05 Electrical and Mechanical Systems, Energy Considerations

Tracking energy considerations for electrical systems on monthly utility bills is possible. Typical categories for energy usage are as follows:

- ◆ **Demand Charges:** peak demand charges "ratchet," meaning that monthly peak usage impact billing periods beyond the current month. Plan facilities to space peaks so that total peaks are at minimum levels. Carefully schedule equipment operation and building programming. Schedule large equipment loads (e.g. electric kilns) to operate at a different time than large kitchen loads. Review the usage of kilns, welders, or other high-energy equipment to keep electric peaks as even as possible.
- ◆ **KWh Charges:** energy usage charges are for actual watt-hours. Keeping lights and other unused equipment shut off helps to control these costs.
- ◆ **Power Factor Penalties:** poor power factor results in penalties that can be costly. Building managers need to track power factor charges on monthly bills. Power factor improvement is easily attainable, and payback periods can be very short. Facility design should account for power factor improvement.
- ◆ **Rates:** negotiate with utility companies for energy rate categories. Often schools have winter electrical peaks, while utilities have summer peaks. Depending on how the school year is planned, utilities may be in a position to offer more attractive rate schedules. "Time of Day and Peak Control" are typical rate schedules that can provide significant cost credits.

The ASHRAE 62-1989 Guidelines to Acceptable Indoor Air Quality is used in designing mechanical ventilation systems to determine the acceptable amounts of outdoor air to deliver to various school spaces based on the occupant density and the use of the space. An air conditioned computer lab, for example, would require more outdoor air and generates higher energy consumption than a general classroom.

The key in any mechanical design project is to maximize indoor air quality while incorporating strategies to conserve the greatest amount of energy. It is important that school districts and architects review energy conservation options early on and include a variety of techniques in school construction projects. When planning mechanical systems, consider the following:

1. How will staff (scheduling) and community use the building?
2. What heating and cooling systems does school maintenance desire?
3. What portion of the facility will be air conditioned?
4. Will classes be year-round within five years?
5. What provisions need to be made for possible future building expansion?

6. Will the building house indoor air quality units in mechanical spaces or on roofs?
7. How will the building design ease the servicing of equipment and changing filters?

Key elements in proper maintenance of mechanical equipment include the following:

- ◆ Design mechanical air handling equipment for designated indoor spaces;
- ◆ Provide adequate space in mechanical rooms;
- ◆ Locating mechanical equipment outdoors or where it is difficult to access will likely result in equipment being ignored and not properly maintained;
- ◆ Standardize filters in air handling equipment to simplify replacement;
- ◆ Design mechanical systems that maintenance staff is familiar with or trained in operating and maintaining, making routine maintenance and problem resolution more certain; and
- ◆ Design control systems using a total DDC (direct digital control) system which permits daily logging of building and space conditions, allows adjustments of space temperatures and system settings from the system's central computer, and alarms the operator of system failures.

Source:

<i>PUBLICATION</i>	<i>AUTHOR</i>
<i>ASHRAE 62-1989 GUIDELINE TO ACCEPTABLE INDOOR AIR QUALITY</i>	<i>AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR CONDITIONING ENGINEERS, 1990</i>

Part 4.06 Lighting, Electrical Service

Electrical lighting remains the highest portion of a school district's energy bill. School districts must meet the Minnesota Energy code for energy efficient lighting and controls, while not losing sight of ergonomic considerations. Realize energy savings by utilizing occupancy sensors, daylight sensors, and energy management controls. Considerations for lighting and electrical service include the following:

- ♦ **Ballasts, Lamps:** design high efficiency ballasts and lamps with the proper tolerances for voltage. Select lamps for the desired color and rendering, lamp life, and rated mean lumens to realize the maximum lumens per watt. If using electronic ballasts, plan locations carefully as they can cause interference with other electronic equipment.
- ♦ **Fixture Types:** select lighting fixtures with careful consideration for lighting sources (direct, indirect, or a combination) for achieving the desired illumination levels. Minimize glare from fixtures with linear type direct/indirect fixtures. Include economic considerations such as first cost and life cost to attain the maximum benefit during the expected life of the lighting system.
- ♦ **Exterior Lighting:** operating safety and security lighting systems during off-peak hours minimizes these costs. Exit and exterior security lighting needs to meet life safety and local codes with regard to light pollution. Parking lot lighting needs to ensure the safety of the public during evening events. Lighting should be vandal-proof, and roadways sufficiently illuminated.
- ♦ **Lighting Controls:** minimize energy usage by using occupancy sensors. Properly selected sensors are effective for nearly all applications. Combine these sensors with energy management systems to provide control of heating and air conditioning, in addition to lighting. Utilize daylight sensors for spaces that have good day lighting potential. Utility companies often have programs that can provide capital dollars to supplement first cost, paid back through electric energy bills, usually for periods of about three years.
- ♦ **Services:** design electrical services to be convenient for building operators. Totally meter services wherever possible. Connect loads to allow operators to take advantage of diversity. Standardize ballasts, lamps, and fixtures to simplify replacement. Consider ease of maintenance, especially for changing lamps in areas with high ceilings such as stairways, gymnasiums, and auditoriums. Consider utilizing generators for life safety systems, and for the potential operation of discretionary systems such as boilers and kitchen coolers. Extended loss of power can result in large losses due to freezing buildings in winters, and loss of cooling during summers. Combining investments in generation with emergency systems can be justifiable in many cases.

- ◆ Ergonomics: increasing use of computer applications, ergonomics, and direct/indirect lighting can impact students' well being and the teaching/learning process. Investigate day lighting schemes that utilize natural light and reduce the dependency on artificial fluorescent light.
- ◆ Communications Systems: school buildings typically include telephone, intercom, and public address communications systems. A digital telephone system will provide both telephone and intercom communications. Install fully functional telephones to permit dialing outside the building from every classroom, and provide voice mail access throughout the building. Consider connecting the telephone system to the public address system to allow paging announcements and music broadcasts on speakers throughout the building. Provide a master clock system to synchronize clocks throughout the facility.
- ◆ Video Systems: provide a television in every classroom to transmit cable television broadcasts and other media resources (e.g. VCR tape). Consider housing media retrieval equipment in a central, secure location, managed by one person, to permit teachers to access media resources through a touch pad or remote control.
- ◆ Computer Networking System: locate communications closets so that wiring will meet code and industry standards. Design the system, including closet and conduit spaces, to accommodate future technology growth.

In planning for a new school facility, addition, or renovation project, program and future considerations will also impact the design and size of electrical services. These would include year-round use areas, potential additions such as swimming pools or auditoriums, the number of computers in classrooms, future air conditioning loads, and desired indoor air quality. In collaboration with the architect, electrical engineer, communications, video, and technology specialists, and local utility companies, school districts need to carefully plan electrical service and distribution.

Part 4.07 Charter Schools and Private Schools

Charter schools are public schools under M.S. 124D.10, subd. 7, exempt from many laws and rules applicable to a school district, unless a charter school chooses to participate in programs which require compliance. Regarding school facilities, under M.S. 124D.11, charter schools may lease a building or land, use general and total capital operating revenues to maintain, repair, and renovate school facilities, but may not use money received from the State to purchase land or buildings.

Charter schools and private schools must meet all state and local requirements relating to building codes or health and safety. Charter and private schools may choose to consider the guidelines relating to school site or spaces as contained in this Guide.

Sources:

MINNESOTA STATUTES	SUBDIVISIONS
124D.10	7
124D.11	

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